FOURTH FIVE-YEAR REVIEW REPORT FOR MARZONE INC./CHEVRON CHEMICAL CO. SUPERFUND SITE TIFT COUNTY, GEORGIA

JUNE 2017

Prepared by

U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia

Franklin E. Hill, Director
Superfund Division

7/11/17
Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
AROD	Amended Record of Decision
BHC	Hexachlorocyclohexane
CCC	Chevron Chemical Corporation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
F&G	Funnel-and-Gate
GAC	Granular Activated Carbon
FYR	Five-Year Review
GAEPD	Georgia Environmental Protection Division
HQ	Hazard Quotient
IC	Institutional Control
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SDWA	Safe Drinking Water Act
TBC	To-Be-Considered
UU/UE	Unrestricted Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Marzone Inc./Chevron Chemical Co. Superfund site (the Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of two operable units (OUs) and both OUs are addressed in this FYR. OU1 addresses soil and groundwater contamination on the northern portion of the Site and OU2 address soil, sediment and groundwater contamination on the southern portion of the Site.

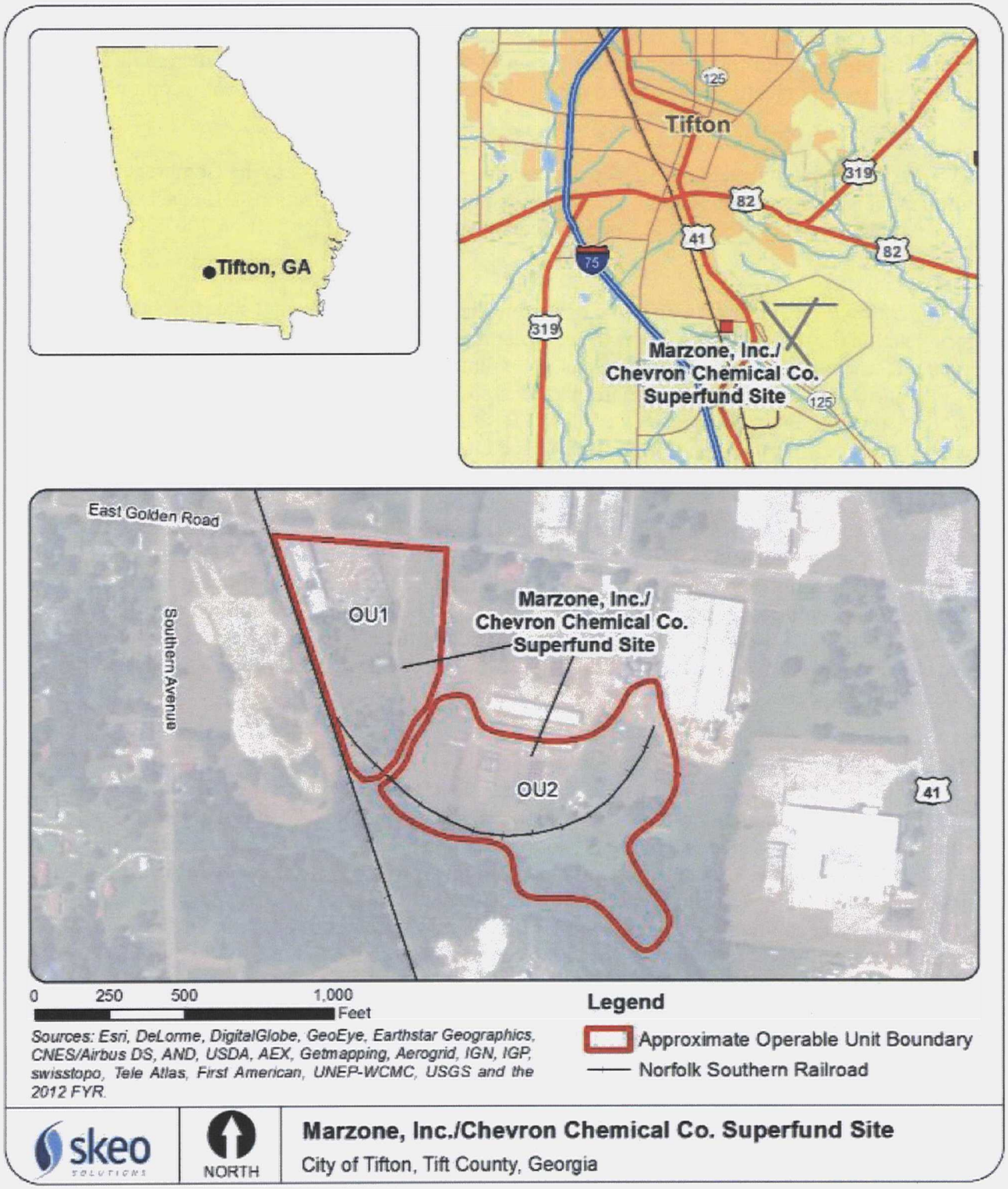
The FYR was led by EPA remedial project manager (RPM) Robenson Joseph. Participants included Yi Lu with the Georgia Environmental Protection Division (GAEPD); Christopher Swiney from ARCADIS, the operation and maintenance (O&M) contractor for Chevron Chemical Corporation (CCC); and EPA contractor support from Treat Suomi and Claire Marcussen of Skeo. The relevant entities such as the PRP were/was notified of the initiation of the FYR. The review kicked off when the EPA approved the work plan for the FYR on 6/15/2016. Documents used to prepare this FYR are summarized in Appendix A.

Site Background

The 24-acre Site is located in Tifton, a rural area in southern Georgia (Figure 1). Site surroundings include light industrial, agricultural and residential land uses. CCC and Marzone Chemical Company (Marzone) operated a pesticide and herbicide formulation plant on OU1, the 6-acre northern portion of the Site. South of the plant was a planing mill and burn pit area where historical operations burned planing wastes. Different companies operated a pesticide and fertilizer formulation and packaging plant on OU2, the 18-acre southern portion of the Site. Plant operations at both OUs released pesticide contamination to soil and groundwater; OU2 sediment was also contaminated. Sources of OU1 contamination included releases from the formulating area, discharges to unlined drainage ditches and a former rinsate pond, spills from poor housekeeping practices, and a former burn pit area (Figure 2). The sources of OU2 contamination included drums and disposal pits. Until the summer of 2016, a recycling business operated in the warehouse on OU1. The business is no longer in operation. The Banner Seed and Peanut Company currently operates a peanut processing and storage facility at OU2.

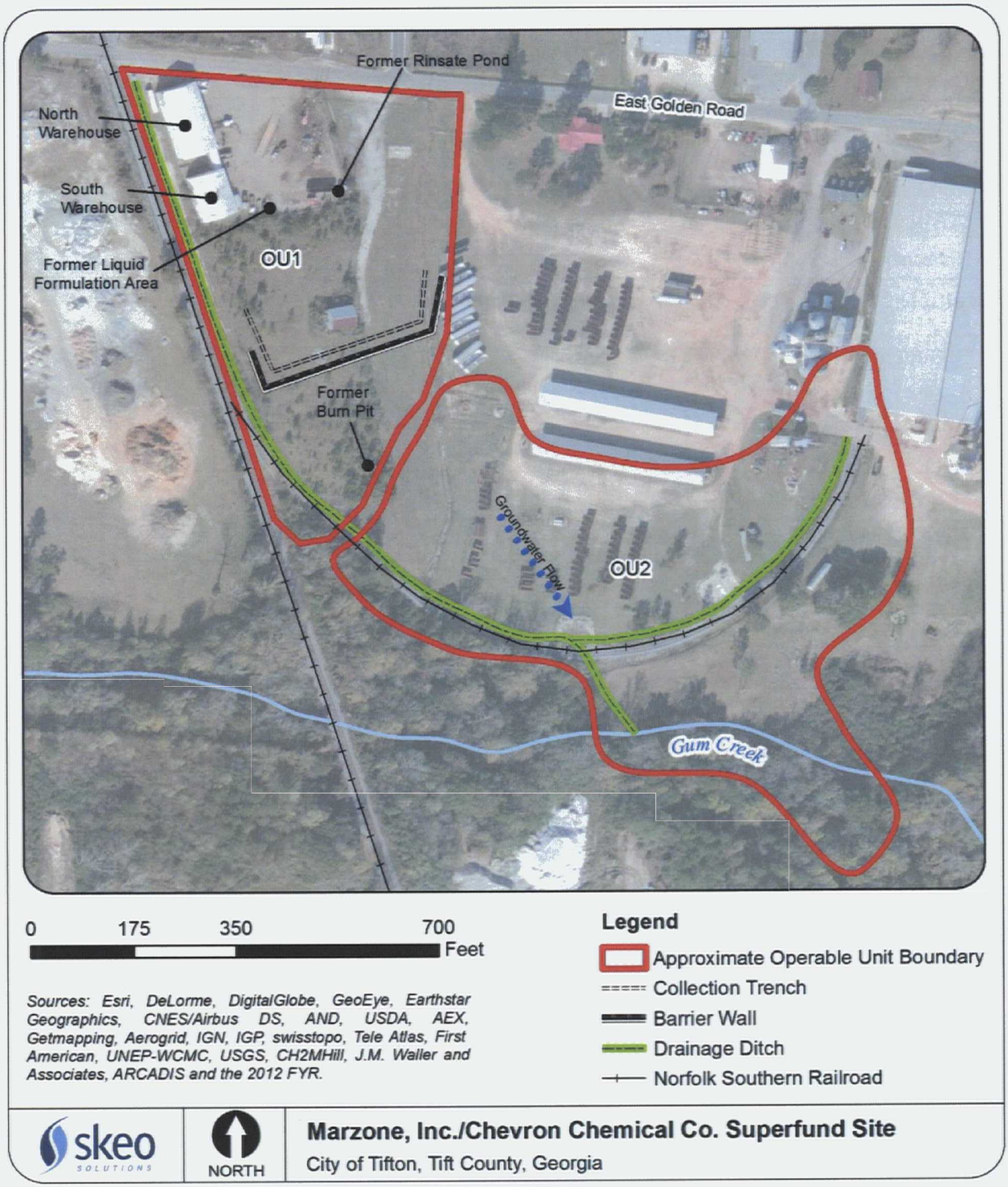
Site topography is flat with overland flow toward the railroad drainage ditch, which then flows southeast to Gum Creek. The Site is underlain by two groundwater aquifer zones, the shallow aquifer (Hawthorne) followed by the deep aquifer (Floridan). The Hawthorne is confined from the Floridan aquifer, which serves as the regionally significant source of potable water supply in the site area. Groundwater flow at the Site is to the southeast.

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site, and is not intended for any other purpose.

Figure 2: Detailed Site Map



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FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Marzone Inc./Chevron Chemical Co.		
EPA ID: GAD991275686		
Region: 4	**State:** GA	**City/County:** Tifton/Tift
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name: Robenson Joseph (EPA) and Claire Marcussen (Skeo).		
Author affiliation: Skeo and EPA		
Review period: 6/15/2016 - 6/15/2017		
Date of site inspection: 10/4/2016		
Type of review: Policy		
Review number: 4		
Triggering action date: 7/3/2012		
Due date *(five years after triggering action date)*: 7/3/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The potentially responsible parties (PRPs) and the EPA prepared baseline risk assessments in 1993 and 1998 for OU1 and OU2, respectively. The risk assessments demonstrated that potential current and future exposure of humans to contaminated soil and groundwater could result in unacceptable human health risks. In addition, the OU2 ecological risk assessment indicated that sediment contamination in Gum Creek posed unacceptable risks to ecological receptors. Table 1 and Table 2 summarize the primary exposure media and contaminants of concern (COCs) for OU1 and OU2.

Table 1: Summary of Contaminated Media and COCs at OU1[a]

OU1 COC	Surface Soil	Subsurface Soil	Groundwater
Pesticides/Herbicides			
Atrazine	X	X	
Alpha-hexachlorocyclohexane (alpha-BHC)	X	X	X
Beta-BHC		X	X
Dichloro-diphenyldichloroethane (DDD)	X		X
Dichloro-diphenyldichloroethylene (DDE)	X		
Dichloro-diphenyltrichloroethane (DDT)	X		X
Dieldrin	X		
Dioxin	X		
Endosulfan II	X		
Gamma-BHC (Lindane)		X	X
Heptachlor Epoxide	X		
Methyl Parathion		X	X
Toxaphene	X		
Organic Compounds			
Ethylbenzene		X	X
Xylene		X	X

Notes:
a. Information obtained from the 1994 Record of Decision (ROD).
Blank – contaminant not a COC in that medium.

Table 2: Summary of Contaminated Media and COCs at OU2[a]

OU2 COC	Surface Soil	Sediment	Groundwater
Pesticides/Herbicides			
Alpha-BHC			X
Lindane			X
Alpha-chlordane	X	X	
Gamma-chlordane	X	X	
DDT	X	X	
DDE	X	X	
DDD	X	X	
Dinoseb			X
Endrin			X
Toxaphene	X	X	
Inorganic Compounds			
Aluminum			X
Beryllium			X
Cadmium			X
Copper	X	X	
Iron			X
Lead	X	X	X
Manganese			X
Nickel			X
Nitrate/Nitrite			X
Zinc	X	X	

Notes:
a. Information obtained from the 1999 Record of Decision (ROD).
Blank – contaminant not a COC in that medium.

Response Actions

A summary of the response actions at the two OUs is provided below. A detailed summary of the site chronology is presented in Appendix C. The EPA proposed the Site for listing on the Superfund program's National Priorities List (NPL) in June 1988. The EPA listed the Site on the NPL in October 1989.

OU1

At OU1, various site owners completed several removal actions between 1980 and 1984. These activities included the removal of drums of pesticides, contaminated sludges, hazardous waste and contaminated soil. A removal action by the EPA at OU1 in late 1984 removed over 1,700 tons of waste.

The EPA issued the OU1 Record of Decision (ROD) on September 30, 1994. It indicated that the cleanup objective for OU1 was to remediate groundwater to levels appropriate for residential use. The major components of the groundwater remedy as outlined in the 1994 ROD and further modified in the 2000 Amended Record of Decision (AROD) include:

- Institutional controls to restrict the use of groundwater as a drinking water source until performance standards are achieved.
- Design and construction of an in-situ funnel-and-gate (F&G) system, consisting of an impermeable barrier wall to direct contaminated groundwater (approximately 93 percent of total contamination) through a granular activated carbon (GAC) treatment medium.
- Startup and O&M of this system.
- Reduction of groundwater contamination south of the treatment system (about seven percent of the total contamination) by natural attenuation.
- O&M of a long-term groundwater monitoring program, including periodic monitoring of the effectiveness of the treatment system and of natural attenuation.
- Proper closure of the treatment system after performance standards are met.

The performance standards for the COCs in groundwater are summarized in Table 3.

Table 3: OU1 Groundwater COC Performance Standards

Groundwater COC	ROD Performance Standard (µg/L)[a]
Pesticides/Herbicides	
Alpha-BHC	0.03[b]
Beta-BHC	0.1[b]
DDD	0.77[b]
DDT	0.54[b]
Lindane	0.2[c]
Methyl parathion	3.9[b]
Organic Compounds	
Ethylbenzene	700[c]
Xylene	10,000[c]

Notes:
a. Values listed in the 1994 ROD, Table 11.
b. Risk-based cleanup goals.
c. Groundwater cleanup level based on maximum contaminant level (MCL).
µg/L = micrograms per liter

The EPA also selected the soil remedy for OU1 in the 1994 ROD and modified the remedy four times in a 1996 Explanation of Significant Differences (ESD), a 1997 AROD, a 1998 ESD and a 1998 AROD.

The objectives of the OU1 soil remedy are to reduce or eliminate human and environmental exposures. The final OU1 remedy for surface and subsurface soil consists of:

- Excavation of all surface soil that has contaminant concentrations above the performance standards.
- Excavation of subsurface soil to meet performance standards that will also achieve protection of groundwater.
- Transportation of the soil from the main portion of the Site to a permitted landfill for off-site disposal.
- Placement of clean fill soil in the excavated areas.
- Air monitoring to ensure safety of nearby residents and workers.

The EPA developed performance standards for the soil COCs in the 1994 ROD. In the 1998 AROD, the EPA established a new COC and performance standard for dioxin in the former burn pit area. A summary of the soil cleanup goals is presented in Table 4.

Table 4: OU1 Soil COC Performance Standards

Soil COC	OU1 Performance Standards (mg/kg)[a]	
	Surface Soil[b]	Subsurface Soil[c]
Pesticides/Herbicides		
Atrazine	3.5	0.150
Alpha-BHC	0.12	1.142
Beta-BHC	-	0.547
DDD	3.2	-
DDE	2.28	-
DDT	2.29	-
Dieldrin	0.049	-
Dioxin	0.001[d]	-
Endosulfan II	2.6	-
Heptachlor epoxide	0.085	-
Lindane (Gamma-BHC)	-	0.463
Methyl parathion	-	4.55
Organic Compounds		
Ethylbenzene	-	57.3
Toxaphene	0.7	-
Xylene	-	213

Notes:

a. The EPA established soil performance standards in Table 12 of the 1994 ROD for all soil COCs except dioxin, which the EPA identified as a COC in the 1998 AROD and established a performance standard for in Table 1 of the 1998 AROD.

b. Surface soil cleanup levels are based on future residential land use. Cleanup levels are based on a cancer risk of 1 x 10^{-6}, or a hazard index of 1.0. Surface soil refers to the top foot of soil.

c. Subsurface soil cleanup levels are leachability-based levels calculated using a fate and transport model.

d. Obtained from Office of Solid Waste and Emergency Response (OSWER) Directive No. 9200.4-26, dated April 13, 1998, which established a surface soil level of 0.001 mg/kg for dioxin for residential sites as specified on page 8 of the 1998 AROD.

-- = no cleanup level set because chemical is not a COC for the medium.

mg/kg = milligrams per kilogram

OU2

In 1993, the EPA completed a removal action at OU2 including the removal of containers of chemicals,

pesticides and herbicides; contaminated debris and heavily-contaminated surface soils; and several on-site structures. The removed materials were shipped off site to a permitted landfill. Excavated areas were backfilled with clean fill.

On July 1, 1999, EPA issued a ROD for OU2. It selected a remedy to address the principal threat wastes of toxaphene and dichlorodiphenyltrichloroethane (DDT) and its breakdown products, as well as secondary threat wastes of chlordane, hexachlorocyclohexanes (BHCs), endrin, dinoseb and metals. The remedial action objectives (RAOs) defined in the 1999 ROD are:

- Containment or treatment of all contaminated surface soils above health-based or ecological action levels.
- Containment or treatment of contaminated sediment above ecological action levels.
- Restoration of groundwater to drinking water standards.

The major components of the OU2 selected remedies for soil, sediment and groundwater include:

- Excavation of contaminated surface soils and sediment with off-site disposal to a permitted Subtitle C or D landfill.
- Restoration of surface soil and wetland areas along Gum Creek.
- Confirmation sampling to verify that contaminant concentrations in remaining soil and sediment are below performance standards.
- Monitoring of wetland and creek areas for at least five years to determine if remaining contamination is naturally attenuating. Levels of contamination in these areas do not pose an immediate or acute threat; therefore, access restriction is not necessary.
- Installation of at least two additional groundwater monitoring wells.
- Annual groundwater monitoring for at least five years for the COCs, potential transformation products and geochemical parameters to determine if contamination is naturally attenuating.
- Implementation of an in-situ treatment wall system as a contingency remedy if the EPA determines that natural attenuation has been ineffective after five years of monitoring.
- Institutional controls to restrict use of contaminated groundwater.

A summary of the performance standards developed by the EPA for OU2 soil and sediment is included in Table 5; the performance standards for OU2 groundwater are listed in Table 6.

Table 5: OU2 Soil and Sediment COC Performance Standards

COC	1999 OU2 ROD Performance Standards[a]	
	Surface Soil (mg/kg)	Sediment (mg/kg)
Pesticides/Herbicides		
Alpha-chlordane	0.1	0.1
Gamma-chlordane	0.1	0.1
DDT	1.0	5.0
DDE	1.0	5.0
DDD	2.0	5.0
Toxaphene	0.4	3.0
Inorganic Compounds		
Copper	20	20
Lead	330	330
Zinc	100	100
Notes:		

COC	1999 OU2 ROD Performance Standards[a]	
	Surface Soil (mg/kg)	Sediment (mg/kg)
a. Based on the most stringent level to protect ecological risk or future residential exposure at a 1 x 10^{-6} cancer risk and a noncancer hazard of less than 1.0. mg/kg = milligrams per kilogram		

Table 6: OU2 Groundwater COC Performance Standards

COC	1999 OU2 ROD Performance Standards (µg/L)	Basis for Standard
Pesticides/Herbicides		
Alpha-BHC	0.03	Action level for drinking water
Lindane	0.2	MCL
Endrin	2	MCL
Dinoseb	7	MCL
Inorganic Compounds		
Aluminum	28,702	Noncancer Hazard Quotient (HQ) of 1
Beryllium	4	MCL
Cadmium	5	MCL
Manganese	660	Noncancer HQ of 1
Nickel	100	MCL
Lead	15	Action level for drinking water
Iron	8,611	Noncancer HQ of 1
Nitrate/Nitrite	1,000	MCL for nitrite
Notes: HQ = hazard quotient µg/L = micrograms per liter MCL = maximum contaminant level		

Status of Implementation

OU1

On July 11, 1995, the EPA issued a Unilateral Administrative Order to CCC and Kova Fertilizer, Inc., the two PRPs for OU1. Pursuant to the terms of the Order, the two companies agreed to perform the remedial design and remedial action. The PRPs completed demolition activities between June and July 1996 with contaminated debris disposed of off-site at a secure Subtitle D landfill. In addition, several old tanks and concrete pads were also demolished and removed from the Site. During the fall of 1996 and May 1999, the PRPs excavated surface and subsurface soil on the northern portion of the Site and disposed of the soil in a permitted off-site landfill. Excavated areas were backfilled with clean fill.

The F&G system was first installed as a full-scale pilot project in 1998. It has been operating since that time to remove COCs from groundwater. In response to a recommendation made in the 2012 FYR, the PRPs initiated additional investigations in 2016 to potentially enhance the groundwater remedy to reduce the treatment timeframe.

OU2

Remedial design and remedial action at OU2 was conducted by the EPA. Sampling activities conducted by the EPA in support of the remedial design identified additional areas of soil and sediment contamination requiring remediation to include 5.67 acres of contaminated surface soil north of the railroad spur and 1.48 acres of sediment contamination, including the wetland area south of the railroad spur.

In 2006, the EPA completed excavation activities and transported the excavated soil and sediment to an approved landfill. Excavated areas were backfilled with clean fill. Groundwater contamination is addressed by MNA and continues to be monitored.

Based on a review of groundwater monitoring data collected in 2009 and 2010, the EPA concluded that decreasing groundwater contaminant concentrations were not definitively demonstrated. Groundwater concentrations remained elevated in the northeast portion of OU2 in the shallow monitoring zone near monitoring wells MARMW02SH and MARMW08SH. In response, the EPA completed a focused feasibility study, which identified in-situ treatment as a potential alternative to enhance and accelerate the existing natural attenuation remedy. The EPA initiated a treatability and pilot-scale study in 2014 using in-situ chemical reduction. The EPA is reviewing the pilot study results to determine the effectiveness of the technology in addressing the residual groundwater contamination.

Institutional Controls

Institutional controls are part of the remedy for groundwater. An environmental deed affidavit was recorded for the Golden Seed/Taylor property (tax parcel number T061 021), a main portion of OU2, on June 15, 1995. On July 26, 2000, Golden Seed Processors, Inc. filed a declaration of restrictions for OU1 property parcel T061 013. An environmental covenant was placed on the former Slack property (tax parcel number T061 014) at OU1 on January 22, 2013. Both the 2000 declaration of restrictions and the 2013 environmental covenant restrict groundwater use beneath the properties and the installation of wells other than those used to monitor the remedy. In addition, the 2013 environmental covenant restricts activities that may damage the remedy. All parcels associated with OU1 are zoned for industrial use. As shown in Figure 3, groundwater restrictions need to be expanded to include additional parcels where the groundwater plume is present. Table 7 presents a summary of the status of the ICs.

Table 7: Summary of Planned and/or Implemented Institutional Controls (ICs) for OU1 and OU2

Media, Engineered Controls, and Areas that Do not Support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Area of Interest (Parcels: T061 013, T061 014, T061 015, T061 020, T061 021, T061 022 and T061 026)					
Groundwater	Yes	Yes	T061 013	Restrict use of groundwater	Declaration of Restrictions recorded on July 26, 2000 for parcel.
			T061 014		A uniform environmental covenant was placed on the parcel on January 22, 2013
			T061 021 T061 015 T061 026		None. The OU2 remedy requires institutional controls for groundwater on these parcels.
Soil	No	No	None	None – soil cleaned to UU/UE	Not applicable

Systems Operations & Maintenance

OU1

The F&G system with MNA is the groundwater remedy for OU1. The F&G system consists of an impermeable barrier wall that directs contaminated groundwater through a GAC treatment medium and natural attenuation south of the treatment system. The full-scale F&G remedy was installed in 1998 and has been treating groundwater since installation. The funnel portion of the system is a low-permeability cutoff wall inserted into the aquifer to direct flow toward the permeable gate portion of the system. The gates are made of pre-cast concrete vaults, steel piping and valves. An adsorptive medium, GAC, is installed within the gate.

The PRP conducts long-term monitoring and maintenance activities per the 1998 Long-term Groundwater Monitoring Plan to Evaluate Natural Attenuation and the 2002 O&M Manual for the F&G system. The primary activities associated with O&M include:

- Quarterly water level monitoring and flow rate measurements.
- Semi-annual treatment system sampling.
- Annual MNA sampling.
- Miscellaneous system improvement and maintenance activities.

During the FYR period, the PRP completed the following repairs and maintenance:

- April 2012: Replaced the solar controller and battery for the automated flushing system.
- May 2013: Installed and developed monitoring well MW-15S and replaced well boxes for several wells to include new locks.
- 2015: Repaired perimeter chain-linked fence and completed vegetation abatement.

The average annual cost for routine O&M activities for OU1 was $51,000. The higher costs in 2013 are due to additional well installation and implementation of a pilot test. O&M costs were estimated to be $285,500 for the duration of the remedy selected in the 1994 ROD. However, the costs were not estimated in subsequent decision documents that enhanced the remedy.

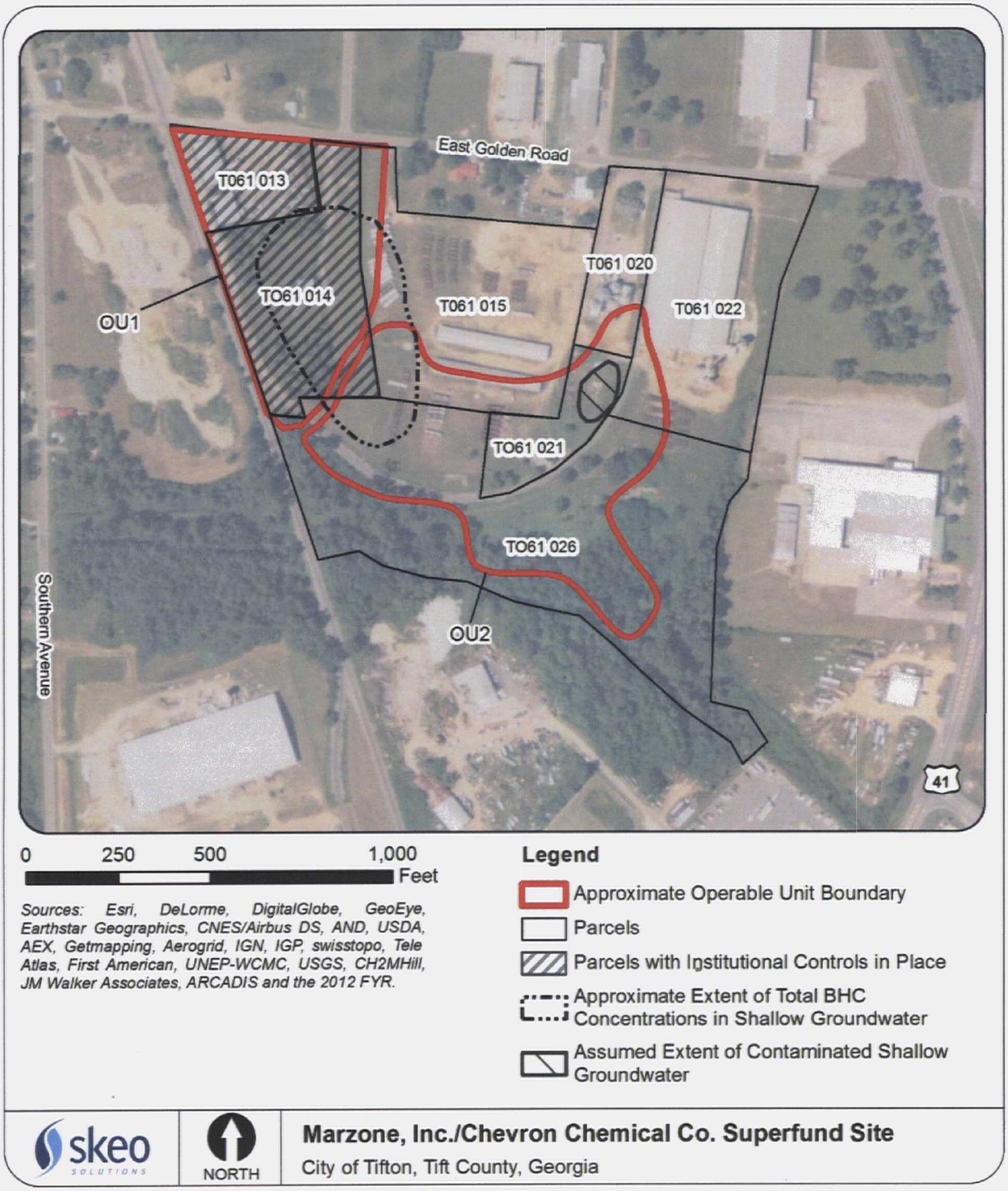
Table 8: OU1 Annual O&M Costs

Year	Total Cost (rounded to nearest $1,000)
2012	$52,000
2013	$108,000
2014	$53,000
2015	$78,000
2016	$68,000

OU2

O&M activities, completed by the EPA since the 2012 FYR, are ongoing monitoring of groundwater. The EPA is currently reviewing monitoring results to determine if additional technologies are necessary to enhance MNA at this OU.

Figure 3: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR, as well as the recommendations from the last FYR and the current status of those recommendations.

Table 9: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1 &2	Short-term Protective	The remedies implemented are protective of human health and the environment in the short term because contaminated soil and sediments have been excavated, monitoring is ongoing, and there is no evidence of current exposure or completed pathways to site-related contamination. However, in order for the remedy to be protective in the long term, implementation of the groundwater institutional controls as specified in the OU1 1994 ROD and the OU2 1999 ROD is necessary. In addition, the groundwater data collected since the last FYR indicate the concentrations of the site-specific COC are either decreasing or fluctuating. Therefore, evaluation of potential optimization of the groundwater remedies is necessary to enhance COC attenuation.

Table 10: Status of Recommendations from the 2012 FYR

Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
OU1				
Institutional controls, as called for in decision documents, are not in place to restrict groundwater use on a portion of OU1.	Implement institutional control and access agreement for OU1 T061 014 parcel.	Completed	A uniform environmental covenant was placed on parcel T061 014 on January 22, 2013.	1/22/2013
OU1 groundwater MNA data indicate optimization is necessary.	Evaluate potential optimization of the OU1 groundwater MNA, and implement optimization accordingly.	Ongoing	PRP initiated treatability/pilot study in 2013. Collected data indicated that additional investigation is necessary to further delineate the extent of the area requiring active remediation.	Not applicable
OU2				
Institutional controls, as called for in decision documents, are not in place to restrict groundwater use at OU2.	Implement institutional controls to restrict groundwater use on OU2 properties.	Ongoing	The EPA is working with property owners to implement the necessary institutional controls.	Not applicable
OU2 groundwater data indicate optimization is necessary.	Review effectiveness of MNA at OU2. Evaluate alternative groundwater remedies and implement the preferred alternative.	Ongoing	In 2012, the EPA initiated a treatability pilot study using in-situ chemical reduction to enhance MNA in addressing the residual groundwater contamination. The EPA is reviewing the collected data to assess the effectiveness of the technology to address the contamination.	Not applicable

Issue	Recommendations	Current Status	Current Implementation Status Description*	Completion Date (if applicable)
Some monitoring wells had broken locks and illegible labels during the site inspection.	Replace or fix broken locks and re-label wells as needed.	Completed	The well boxes were replaced with lockable stick-up monuments.	5/10/2013

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was published in the *Tifton Gazette* newspaper on 1/11/2017. It stated that the FYR was underway and invited the public to submit any comments to the EPA (Appendix E). The results of the FYR and the report will be made available at the Site's information repository, Tifton-Tift County Library, located at 245 Love Avenue, Tifton, Georgia 31794.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The results of these interviews are summarized below with a copy of the interview form in Appendix J.

Mr. Allen Just is CCC's O&M contractor with ARCADIS. He indicated that, due to continued elevated concentrations of BHCs located upgradient of MW-10S, CCC began a pilot test in 2013 to address contaminated subsurface soil using in situ chemical reduction near MW-10S. CCC also conducted additional assessment activities in 2015 and 2016 to further characterize potential sources of BHC contamination at this location. Based on the last five years of data, Mr. Just recommended changes in O&M activities, including adding MW-10D to the monitoring schedule and eliminating the analysis of the groundwater samples for organophosphate pesticides. Organophosphate pesticides were not detected during annual monitoring events in 2015 and 2016. In addition, Mr. Just recommended eliminating quarterly salt flow tests, since this information will not affect system operation or performance. ARCADIS has proposed additional temporary monitoring points for 2017 to further characterize the extent of BHC contamination near MW-10.

Mr. Lu is the project manager for GAEPD. He stated that soil excavation was extensive and has met the performance standards and that active groundwater remediation and routine groundwater monitoring are ongoing. Mr. Lu indicated that natural attenuation is working in the southern part of OU1. While the F&G system intercepts and treats groundwater, additional active soil and groundwater remediation north of the F&G system is likely to occur. Mr. Lu stated that dinoseb levels and the elevated nitrate/nitrite concentration at OU2 may decrease and pH values may improve following the in-situ chemical reduction pilot study. The study was completed in May 2014. Mr. Lu indicated that the effectiveness of the in-situ chemical reduction at OU2 should be studied to determine the need for any additional institutional controls for OU2.

Data Review

OU1

The PRP collects data to evaluate the distribution and attenuation of the dissolved phase contaminant plume in the shallow aquifer and the performance of the F&G groundwater treatment system currently

operating at the Site. Appendix H includes a summary of the treatment system and monitoring data collected between 2011 and 2016. Appendix H figures also show treatment system and groundwater monitoring locations and contaminant plumes.

Remedy Performance

The PRP measures the depth to groundwater quarterly to calculate groundwater flow direction in the shallow aquifer. The results over the last five years demonstrate that groundwater flow in the shallow aquifer is to the southeast, which is consistent with historical interpretations. The PRP monitors natural attenuation of residual groundwater contamination on an annual basis by sampling piezometer AP-03 which is downgradient of the F&G system and monitoring wells north of the F&G system to include: MW-5D, MW-10S and MW-12. The results of the monitoring data for this FYR period indicate that the remedy is working as intended as COC concentrations show a generalized decline indicating that natural attenuation is occurring (Appendix H). For example, the concentrations of alpha-BHC and beta-BHC in downgradient well AP-03 were 3.8 µg/L and 1.2 µg/L, respectively, in 1999 and have decreased to 1.3 µg/L and 0.35 µg/L, respectively in 2014.This well was not sampled in 2015 and 2016.

According to the 2000 AROD, the F&G system should direct about 93 percent of contaminated groundwater through a GAC treatment medium. The F&G groundwater treatment technology uses natural hydraulic gradients to drive contaminated groundwater in the shallow aquifer through an in-situ treatment system. The PRP contractor evaluates the treatment system performance on a semiannual basis by collecting water samples from piezometer SP-01 (system influent), the top of the primary reactor (primary effluent), the top of the series reactor (series effluent) and piezometer SP-02 (system effluent).

The samples collected from SP-01 during the review period routinely showed several COCs above performance standards, while other COCs were detected below performance standards. These results are expected because SP-01 represents groundwater prior to treatment. The results collected from the system effluent (SP-02) and the top of the primary and series reactors indicated that COCs were often below detection or were detected well below performance standards. These results indicate the F&G system is effectively treating groundwater.

The OU1 remedy is functioning as intended by reducing groundwater contaminant concentrations. However, in response to the 2012 FYR recommendations, the PRP initiated additional investigations in 2013 to potentially enhance the remedy to reduce the treatment timeframe. The data associated with these investigations are summarized in the section below.

Ongoing Remedy Optimization Investigations

Due to the presence of residual groundwater contamination above cleanup levels at MW-10S (located upgradient of the barrier wall) additional data has been collected as part of a pilot study initiated by the PRP in 2013. This data is currently being evaluated to optimize the remedy to reduce the treatment timeframe. In May 2013, the PRP applied EHC™ (a mixture of carbon, zero valent iron particles and nutrients) in a slurry form to subsurface soil near MW-10S to enhance the natural degradation of pesticides. The groundwater data from 2015 and 2016 show that concentrations of several COCs remain above performance standards near MW-10S and MW-10D. The PRP indicated that the higher concentrations in well MW-10D may be indicative of residual pesticide-impacted soils upgradient of this well.

The PRP completed additional evaluations in May 2016 to further delineate any residual pesticide-impacted soils upgradient of MW-10D (Appendix H). The PRP reported in the August 2016 Groundwater Investigation Progress Report that the COCs BHCs, DDT, DDD and toxaphene were detected at elevated concentrations in soil at two soil locations and groundwater in most of the temporary wells. Based on these results, the PRP contractor is currently collecting additional data to further delineate the extent of the area requiring active remediation.

OU2

The previous FYR recommended optimizing the groundwater remedy to achieve groundwater cleanup levels for COCs still exceeding performance goals. Therefore, the data included in this review are data collected as part of the ongoing pilot study to determine if in-situ chemical reduction is effective to enhance MNA of groundwater contaminants. The data include results from 2010 (pretreatment) and post treatment data from 2014 to 2017.

Although the groundwater plume has stabilized and is decreasing in size due to the excavation of contaminated soils and sediments in 2006, dinoseb and nitrate/nitrite remain in groundwater above the ROD cleanup goals within the residual plume (in wells MARMW02SH and MARMW08SH) (Appendix H). The EPA initiated a treatability pilot study in 2014 using in-situ chemical reduction to enhance MNA in addressing the residual groundwater contamination. The EPA is reviewing the collected data to assess the effectiveness of the technology to address the remaining contamination.

Preliminary results of the ongoing pilot study show that dinoseb appeared to be fluctuating with a reduction observed at monitor well location MARMW02SH between August 2015 (1,330 µg/L) and September 2016 (9.2 µg/L) almost below the ROD cleanup level of 7 µg/L (Appendix 5). However, in January 2017 an increase was observed MARMW02SH (60 µg/L). The data show a steady increase of dinoseb and nitrate in location MARMW08SH. For example, dinoseb was detected at 0.48 µg/L in February 2015 and 270 µg/L in January 2017 (Appendix H). Due to the presence of dinoseb and nitrate above the cleanup goals, institutional controls may be warranted to prevent future use of groundwater while the remedy continues to be evaluated to reduce the time-frame to achieve groundwater cleanup goals.

Site Inspection

The site inspection took place on October 4, 2016. In attendance were the EPA support contractors Treat Suomi and Claire Marcussen of Skeo; Yi Lu with GAEPD, and Christopher Swiney, O&M contractor with ARCADIS. The purpose of the inspection was to assess the protectiveness of the remedy. The site inspection checklist and photographs are provided in Appendices D and F, respectively.

Site inspection participants met at the Banner Seed and Peanut Company entrance on the south side of East Golden Road. The inspection began in the northern area of OU1. OU1 is enclosed by a secured fence with no trespassing signs. Participants walked south to observe the remediated areas, drainage features and wells. The remediated areas were in good condition and consisted of thick grass with no eroded areas. The drainage features were in good condition with no obstructions or erosion observed. All wells were secured with locks. The concrete well pad for MW-3D was cracked, but the well was not compromised. Inspection participants also viewed the F&G groundwater treatment system, including the reactors and vaults. The treatment system is located within a separate fenced area with a secure gate; it appeared that all components were clearly labeled and in good working condition.

Site participants then proceeded to visit OU2. All wells were locked and in good condition, but many were not labelled. The excavated area is currently covered by vegetated soil and the drainage feature was dry and unobstructed. OU2 is fenced and access is restricted. Participants completed the inspection by visiting the public supply well northwest and upgradient of the Site. There was no evidence of vandalism or trespassing at OU1 or OU2.

Skeo staff visited the designated site repository, Tifton-Tift County Library. The repository file contained work plans, monitoring reports and performance reports from 2014 to 2016.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:
The OU1 remedy is functioning as intended by the decision documents. The PRP remediated soil and sediment. The F&G system along with MNA is treating groundwater contamination. However, as indicated in the 2012 FYR report, optimization of the groundwater remedies is ongoing at OU1 to reduce/expedite the cleanup timeframe.

The OU2 remedy is functioning as intended by the decision documents. Excavation of contaminated soils and sediments was completed by 2006 and the groundwater plume has stabilized and is decreasing in size. Due to exceedances of dinoseb and nitrate/nitrite in groundwater COCs above the ROD cleanup goals within the residual plume (in wells MARMW02SH and MARMW08SH) the EPA initiated a treatability pilot study using in-situ chemical reduction to enhance MNA in addressing the residual groundwater contamination. The EPA is currently reviewing the collected data to assess the effectiveness of the technology to address the remaining contamination. The OU1 and OU2 plumes do not appear to be migrating off site and the contaminated groundwater underlying the Site is not used as a source of drinking water. The decision documents required institutional controls to restrict groundwater at both OUs. Institutional controls for groundwater have not been implemented on OU2 parcels to prevent potential future exposure.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:
Since the last FYR, there have been no changes to the maximum contaminant levels (MCLs) for either OU (Appendix G). In addition, there have been no changes in site conditions that would suggest the presence of new exposure pathways. However, toxicity values for several COCs have changed since the 1994 ROD and 1998 AROD. In 2012, the EPA completed a reassessment of the toxicity of dioxin and published a noncancer toxicity value for use at Superfund sites.[1] In addition, in 2014, the EPA updated

[1] EPA's dioxin reassessment has been developed and undergone review for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The EPA followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment. On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or reference dose (RfD), of $7x10^{-10}$ mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin in EPA's Integrated Risk Information

default exposure assumptions[2]. To determine if the cleanup goals for surface soil, sediment and groundwater remain protective for future residential use, the cleanup goals were evaluated in a screening-level risk evaluation (Appendix I).

The screening-level risk evaluation of groundwater cleanup goals indicates that cleanup goals remain valid (Appendix I). Although several OU2 COCs exceed cleanup goals in groundwater, the remedy remains protective because groundwater at OU2 is not used at the Site. However, to ensure long-term protectiveness, institutional controls need to be implemented to prevent potential future exposure to groundwater. The results of the screening level risk evaluation of the soil and sediment cleanup goals for the Site indicate that residential land use restrictions may be warranted based on toxicity value changes for dioxin in OU1.

In 2008, the PRP evaluated the vapor intrusion pathway at OU1 and concluded that the vapor intrusion exposure pathway does not pose health concern for on-site workers, but could pose a health hazard to future on-site residents. A screening-level vapor intrusion evaluation (Appendix I) was conducted to determine if the 2008 conclusions may have changed. Based on the most current data and toxicity information, the screening-level vapor intrusion evaluation indicates that the 2008 conclusions have not changed. These results support the need to for institutional controls at OU1 to prevent future residential use of the Site.

The RAOs remain valid as the Site is zoned for industrials use and groundwater is not used at the Site.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None – both OUs have issues and recommendations.

System (IRIS). The dioxin cancer reassessment will follow thereafter. The RfD was approved for immediate use at Superfund sites to ensure protection of human health.

[2] The Superfund memo on updated exposure factors can be found at: https://www.epa.gov/risk/update-standard-default-exposure-factors

Issues and Recommendations Identified in the FYR:

OU(s): OU1	Issue Category: Other			
	Issue: A screening-level risk assessment incorporating current toxicity values indicates that the cleanup goal for dioxin in surface soil may no longer be protective for future residential use. In addition, a screening-level vapor intrusion evaluation indicates that volatile COCs may pose a concern if OU1 were developed for future residential use.			
	Recommendation: Evaluate the need for additional institutional controls to address dioxin in soil and the vapor intrusion pathway.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	12/31/2018

OU(s): OU1	Issue Category: Other			
	Issue: OU1 groundwater data indicate optimization may be necessary.			
	Recommendation: Evaluate potential optimization of the OU1 groundwater remedy, and implement optimization accordingly.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	7/31/2019

OU(s): OU2	Issue Category: Institutional Controls			
	Issue: Institutional controls for groundwater have not been implemented as required by the decision documents.			
	Recommendation: Implement the necessary institutional controls to restrict future use of groundwater due to the presence of COCs above ROD cleanup goals.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	7/31/2019

OU(s): OU2	Issue Category: Institutional Controls			
	Issue: OU2 groundwater data indicate optimization may be necessary.			
	Recommendation: Review effectiveness of MNA at OU2. Evaluate potential optimization of the OU2 groundwater remedy, and implement optimization accordingly.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	7/31/2019

OTHER FINDINGS

In addition, the following recommendation was identified during the FYR, but does not affect current and/or future protectiveness:

- Repair the well pad a MW-3D on OU1.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: OU1	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy currently protects human health and the environment because contaminated soil has been excavated and replaced with clean fill and vegetated; the surrounding community is connected to a public water supply. For the remedy to be protective over the long term, EPA will evaluate if additional institutional controls are warranted to prevent potential future residential exposure to soil and indoor vapors.	

Protectiveness Statement(s)	
Operable Unit: OU2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy currently protects human health and the environment because contaminated soil and sediments have been excavated and replaced with clean fill and vegetated; the surrounding community is connected to a public water supply. For the remedy to be protective over the long term, additional institutional controls are warranted to prevent potential future residential exposure to groundwater.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy currently protects human health and the environment because contaminated soil and sediments have been excavated and replaced with clean fill and vegetated; the surrounding community is connected to a public water supply. For the remedy to be protective over the long term, additional institutional controls will be evaluated and implemented as warranted to prevent potential future residential exposure to soil and groundwater at OU1 and OU2, respectively.

VIII. NEXT REVIEW

The next FYR Report for the Marzone Inc./Chevron Chemical Co. Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2012 Annual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. August 2013.

2013 Annual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. March 2014.

2014 Annual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. February 2015.

2015 Annual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. January 2016.

2012 Semiannual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. August 2012.

2013 Semiannual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. January 2014.

2014 Semiannual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. October 2014.

2015 Semiannual System Performance Monitoring Report. Marzone Superfund Site, Tifton, Georgia. ARCADIS. August 2015.

2011 Site Status Update. Marzone Superfund Site, Tifton, Georgia. ARCADIS. December 27, 2011.

Consent Decree. United States of America, Plaintiff v. Chevron Chemical Company, and Kova Fertilizer, Inc., Defendants. United States District Court for the Middle District of Georgia Valdosta Division. March 8, 1996.

Consent Decree. United States of America, Plaintiff vs. Chevron Chemical Co., et al., Defendants. United States District Court for the Middle District of Georgia Valdosta Division. April 21, 1989.

Draft Data Evaluation Report, Monitoring Event - November 2010. Marzone Inc./Chevron Chemical Co. Tifton, Georgia. Prepared for U.S. Environmental Protection Agency by J.M. Waller Associates, Inc. February 2011.

Explanation of Significant Difference for Operable Unit One. Marzone Inc/Chevron Chemical Company Site. Tifton, Tift County, Georgia. Environmental Protection Agency Region 4. June 1998.

Explanation of Significant Difference for Operable Unit One. Marzone Inc./Chevron Chemical Company Site. Tifton, Tift County, Georgia. Environmental Protection Agency Region 4. September 1996.

Final Construction and Remedial Action Report. Remediation of Soil at Operable Unit No. 1. Marzone Superfund Site. Tifton, Georgia. Prepared for Chevron Chemical Company, CH2M Hill, U.S. Environmental Protection Agency, Georgia Department of Natural Resources, Geomega, Environmental Communications Solutions, Planners for Environmental Quality, CDM Federal Programs by CH2M Hill. May 1999.

Final Report Ecological Risk Assessment Operable Unit Two, Marzone Chemical Company Inc. Prepared by Mark D. Sprenger, Ph.D. Environmental Response Team and Dale M. Haroski ERT/REAC for U.S. Environmental Protection Agency Region 4. June 1998.

First Five-Year Review Report for Marzone Superfund Site, Tifton, Georgia. Prepared for U.S. Environmental Protection Agency Region 4 by Geomega Inc. and CH2M Hill. March 25, 2002.

Groundwater Investigation Work Plan - Revised for Marzone Superfund Site. Prepared by ARCADIS. March 2016.

In-situ Chemical Reduction (ISCR) Pilot Study Work Plan for Marzone Superfund Site OU2. Prepared for the EPA by J.M. Waller Associates, Inc. January 2014.

Interim Remedial Action Report, Groundwater Remedy for Marzone Superfund Site Operable Unit One, Tifton, Georgia. Prepared for Chevron Environmental Management Company by Geomega Inc. September 2007.

Interim Remedial Action Report. Marzone, Inc./Chevron Chemical Site. Tifton, Tift County, Georgia. Prepared by CMC, Inc. for Environmental Protection Agency Region 4. September 13, 2006.

Marzone Site Long-Term Groundwater Monitoring Plan to Evaluate Natural Attenuation. Geomega Inc. May 17, 1998.

Operation and Maintenance Manual for the Marzone Funnel-and-Gate Groundwater Treatment System. Prepared for Chevron Chemical Company by CH2M Hill. July 2002.

Pilot Test Work Plan Addendum Marzone Superfund Site. Prepared ARCADIS. March 2013.

Preliminary Groundwater Investigation. Prepared by ARCADIS. August 2015.

Record of Decision Amendment Operable Unit One, Marzone Inc./Chevron Chemical Co., Tift County, U.S. Environmental Protection Agency Region 4. June 18, 1997.

Record of Decision Amendment Operable Unit One, Marzone Inc./Chevron Chemical Co., Tift County. U.S. Environmental Protection Agency Region 4. November 10, 1998.

Record of Decision Amendment Operable Unit One, Marzone Inc./Chevron Chemical Co., Tift County. U.S. Environmental Protection Agency Region 4. May 2, 2000.

Record of Decision Operable Unit One, Marzone Inc./Chevron Chemical Co., Tift County, Georgia. U.S. Environmental Protection Agency Region 4. September 30, 1994.

Record of Decision Operable Unit Two, Marzone Inc./Chevron Chemical Co., Tift County. U.S. Environmental Protection Agency Region 4. July 1, 1999.

Second Five-Year Review Report for Marzone Superfund Site, Tifton, Tift County, Georgia. U.S. Environmental Protection Agency Region 4. September 27, 2007

Second Revised Final Baseline Risk Assessment Operable Unit One, Marzone, Inc./Chevron Chemical Company, Tifton, Tift County, Georgia. Prepared by Dynamac Corporation for U.S. Environmental Protection Agency Region 4. October 20, 1993.

Summary Report Remedial Action at the Former Marzone Chemical Site. Prepared by O.H. Materials Co. for Chevron Chemical Co. August 28, 1985.

Unilateral Administrative Order for Remedial Design and Remedial Action. Marzone Inc./Chevron Chemical Co. U.S. Environmental Protection Agency Region 4. July 11, 1995.

Vapor Intrusion Evaluation. Marzone Superfund Site. Tifton, Georgia. ARCADIS. December 11, 2008.

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators
- Current human exposures at the Site are under control. *- Current groundwater migration is under control.*

Are Necessary Institutional Controls in Place?
☐ All ☒ Some ☐ None *Institutional controls have not been implemented to restrict groundwater use on all impacted parcels*

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?
☐ Yes ☒ No

Has the Site Been Put into Reuse?
☒ Yes ☐ No *Banner Seed and Peanut Company operates a facility within OU2 boundaries. A recycling facility had been operating on the OU1 area of the Site but has been reported by the PRP to have closed in the summer of 2016.*

APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
The EPA discovered contamination at the Site	May 1, 1984
The EPA completed a removal action	December 3, 1984
The EPA issued an administrative order on consent	April 5, 1985
Technical assistance grant start date	April 25, 1995
PRP completed a removal action	May 18, 1985
The EPA completed a site inspection	August 9, 1985
The EPA proposed Site to the Superfund program's National Priorities List (NPL)	June 24, 1988
The EPA signed a Consent Decree with Chevron Chemical Company (CCC), Kova Fertilizer, Inc. and Billy G. Mitchell to address cost recovery incurred by the United States in response to the alleged release or threatened release of hazardous substances at the Site	June 20, 1989
The EPA listed the Site on the NPL	October 4, 1989
The EPA completed a site-wide removal assessment	September 20, 1991
The EPA completed the OU1 human and ecological risk assessment	October 20, 1993
PRP completed the OU1 remedial investigation/feasibility study and the EPA signed the OU1 record of decision (ROD)	September 30, 1994
The EPA issued a Unilateral Administrative Order to CCC and Kova Fertilizer, Inc. to perform the OU1 remedial design/remedial action	July 11, 1995
The PRP began the first phase of the OU1 remedial design	August 14, 1995
Site-wide Consent Decree	February 6, 1996
PRP began the first phase of the OU1 remedial action	May 20, 1996
The EPA signed the OU1 Explanation of Significant Differences (ESD)	September 1996
The EPA signed the first OU1 Amended ROD (AROD) changing the soil remedy	June 18, 1997
PRP completed the final phase of the OU1 remedial design	April 2, 1998
The EPA signed the second OU1 AROD amending the soil remedy	November 10, 1998
The EPA completed the OU2 remedial investigation/feasibility study and signed the OU2 ROD	July 1, 1999
The EPA started the OU2 remedial design	September 24, 1999
The EPA signed the third OU1 AROD to amend the groundwater remedy by selecting the funnel-and-gate system constructed during a pilot study as the final groundwater remedy	May 2, 2000
PRP began the OU1 operation and maintenance (O&M)	September 30, 2000
The EPA completed the OU2 remedial design	September 30, 2001
First FYR signed	March 25, 2002
The EPA issued a site-wide Consent Decree	February 3, 2005
The EPA began the OU2 remedial action	May 10, 2005
The EPA completed the OU2 remedial action	September 13, 2006
The EPA started an OU2 long-term response action	December 1, 2006
The EPA signed the second FYR	September 27, 2007
PRP completed the final phase of OU1 remedial action	September 28, 2007
PRP started an OU1 long-term response action	September 30, 2008
The EPA signed the third FYR	July 13, 2012
The PRP initiated additional groundwater investigations at OU1 in support of remedy optimization	June 2, 2015
The EPA initiated a pilot study at OU2 in support of remedy optimization	June 14, 2014
The PRP initiated additional groundwater investigations at OU1 in support of remedy optimization	May 9, 2016

APPENDIX D – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Marzone Inc./Chevron Chemical Co.	**Date of Inspection:** 10/04/2016
Location and Region: Tifton, Georgia 4	**EPA ID: GAD991275686**
Agency, Office or Company Leading the Five-Year Review: Region 4	**Weather/Temperature:** 77 F, Sunny

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other: Groundwater funnel-and-gate (F&G) treatment system
- ☒ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** Christopher Swiney (Name) O&M manager (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency EPA Region 4
   Contact Robenson Joseph (Name) Remedial Project Manager (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency Georgia Environmental Protection Division
   Contact Yi Lu (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☐ Up to date ☐ N/A

☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ Contractor for EPA for OU2

2. **O&M Cost Records**

☒ Readily available (for OU1) ☒ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: 1/2012 Date	To: 12/2012 Date	$52,000 Total cost	☐ Breakdown attached
From: 1/2013 Date	To: 12/2013 Date	$108,000 Total cost	☐ Breakdown attached
From: 1/2014 Date	To: 12/2014 Date	$53,000 Total cost	☐ Breakdown attached
From: 1/2015 Date	To: 12/2015 Date	$78,000 Total cost	☐ Breakdown attached
From: 1/2016 Date	To: 12/2016 Date	$68,000 Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: In 2013, additonal monitoring points were installed OU1 and remedial pilot test conducted using in-situ chemical reduction.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: All fencing in good condition and secured.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: No trespassing signs posted on fencing.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: Not all institutional controls have been implemented.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: The recycling facility on the northwest corner of OU1 closed summer of 2016 according to the O&M contractor.

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☒ Filters: Granulated activated carbon (GAC)

☐ Additive (e.g., chelation agent, flocculent): _____

☒ Others: Gravity fed filter with flush system.

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of Groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☒ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: OU1 MW-3D well pad is cracked and should be repaired.

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The OU1 remedy is working as intended however, the decline of residual concentrations in groundwater is not occurring at a reasonable timeframe. The OU2 remedy addressed contaminated soil and the groundwater data show that a residual localized plume remains. The EPA is evaluating if in-situ chemical reduction will be effective in addressing the residual groundwater contamination.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M groundwater monitoring has identified localized persistent groundwater plumes at both OU1 and OU2.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

No early indicators of potential remedy problems were observed beyond the ongoing treatability/pilot studies to optimize the groundwater remedies at OU1 and OU2.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The OU1 PRP is currently conducting a treatability/pilot study to improvide the effectiveness of the MNA remedy. The EPA is currently evaluating pilot test results at OU2 using in-situ chemical reduction to enhance MNA in addressing residual contamination. The EPA is currently reviewing the collected data to assess the effectivenss of the technology to adress the remaining contamination.

APPENDIX E – PRESS NOTICE

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Announces a

4th Five-Year Review

For the

Marzone Superfund Site

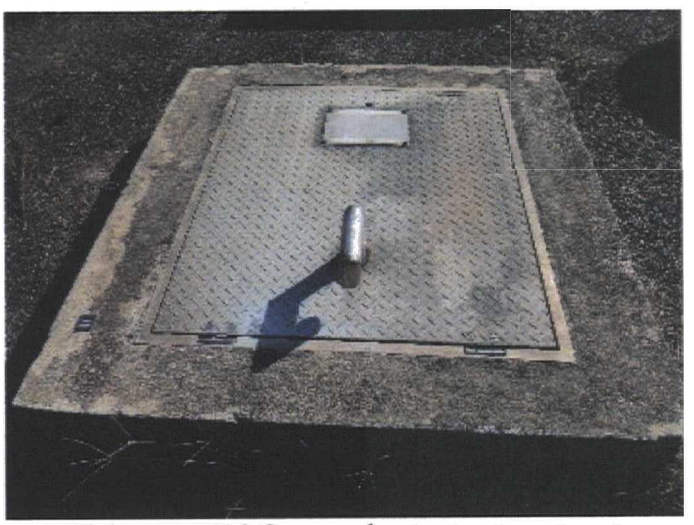
A 4th Five-Year Review is being conducted by the U.S. Environmental Protection Agency (EPA) of the cleanup up activities taken at the Marzone Inc./Chevron Chemical Superfund Site located in Tifton, Tift County, GA. The purpose of this review is to evaluate the implementation and performance of the remedy in order to determine if the remedy is protective of human health and the environment. When completed, a copy of the review report will be placed in the Information Repository files located in the EPA Record Center, 11th Floor, 61 Forsyth Street, S.W. Atlanta, GA 30303, and Tifton County Library Public Library at 245 Love Street, Tifton GA.

EPA will also conduct a number of interviews with nearby businesses, residents, local officials, state officials, and others to obtain their opinion on the cleanup process.

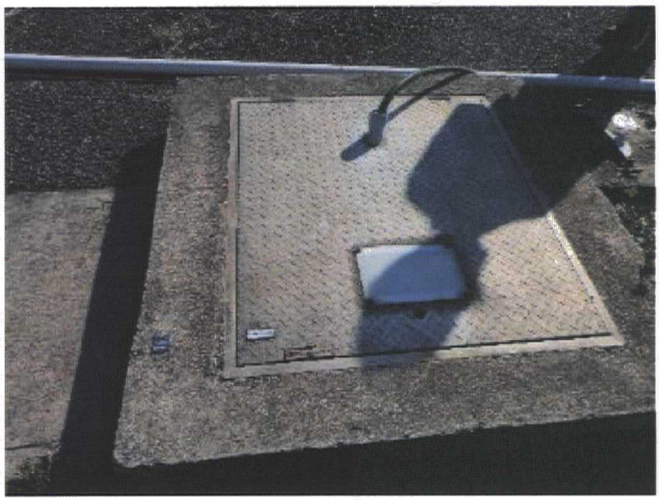
The community can contribute during this review by providing comments or questions. The scheduled date of completion for the five-year review is July 3, 2017. If you would like to speak with us about this Site or are interested in being interviewed, please call Angela Miller, EPA Community Involvement Coordinator at (404) 562-8561 or email at miller.angela@epa.gov. If you have any technical questions, please contact Robenson Joseph, EPA Remedial Project Manager at (404) 562-8891 or email at joseph.robenson@epa.gov.

APPENDIX F – SITE INSPECTION PHOTOS

SP-02 F&G groundwater treatment system.



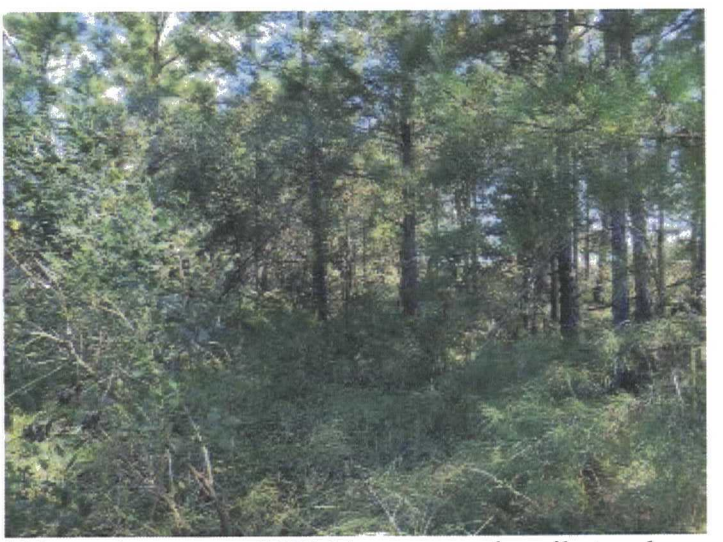
Parallel reactor F&G groundwater treatment system.



Primary reactor F&G groundwater treatment system.

AP-05 with F&G groundwater treatment system.

Solar panels for F&G groundwater treatment system.



Old burn pit area near MW-14, now very heavily treed area.

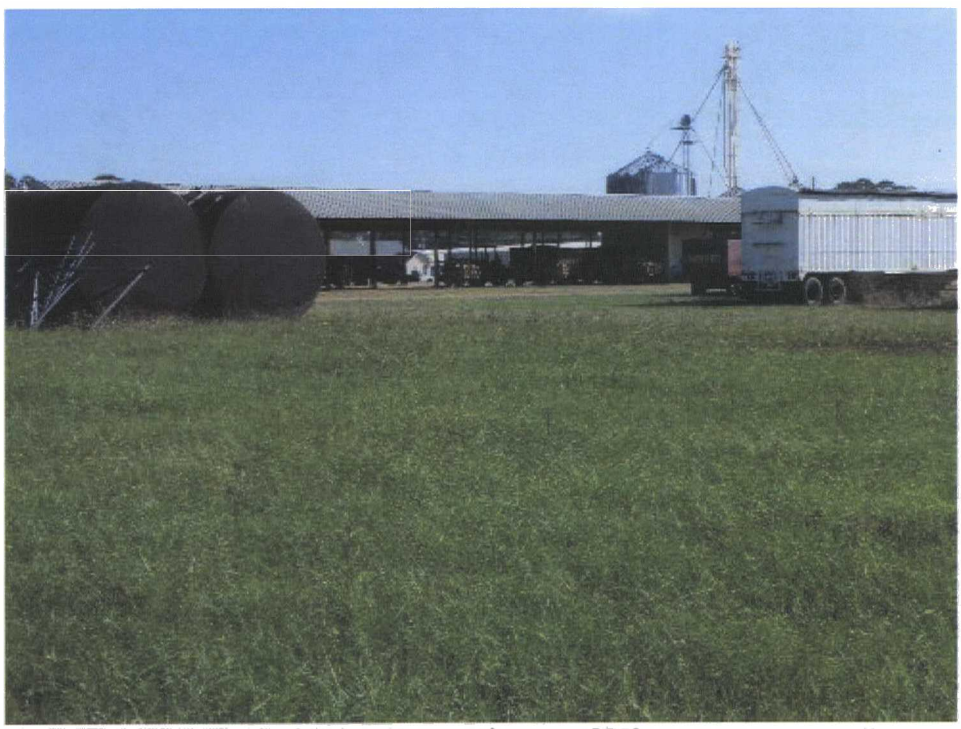
Cracked MW3D well pad.

MW3D and MW3S.

AP-05 and vegetated area of OU1.

Locked gate at OU1.

OU2 monitoring wells and grassy area where historical soil remediation occurred.



Current operations on OU2.

OU2 grassy area of previous soil remedial work.

Flush mount well OU2.

APPENDIX G – DETAILED APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT (ARARS) REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with applicable or relevant and appropriate requirements (ARARs), only those ARARs that address the protectiveness of the remedy are reviewed.

OU1 Groundwater ARARs

The 1994 ROD identified federal MCLs under the Safe Drinking Water Act (SDWA) as ARARs for groundwater. Cleanup goals were based on the MCLs, and when primary MCLs were unavailable, secondary MCLs or other to-be-considered (TBC) criteria were used. Cleanup levels from the ROD were compared to current SDWA MCLs (Table G-1). There have been no changes to the primary MCLs for the three COCs for which MCLs were used as cleanup goals in the 1994 ROD and no new MCLs have been promulgated for the other five COCs.

Table G-1: Previous and Current ARARs for OU1 Groundwater COCs

COC	1994 OU1 ROD ARAR (µg/L)	Current ARAR (µg/L)[a]	ARAR Change
Alpha-BHC	NA	NA	NA
Beta-BHC	NA	NA	NA
DDD	NA	NA	NA
DDT	NA	NA	NA
Ethylbenzene	700[a]	700[a]	None
Lindane	0.2[a]	0.2[a]	None
Methyl Parathion	NA	NA	NA
Xylene	10,000[a]	10,000[a]	None

a. Based on the SWDA primary MCL. Current SDWA standards can be found at: https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants (accessed 6/16/2016).
NA - Cleanup goal is based on TBC criteria.
mg/L – milligrams per liter

OU1 Soil ARARs

The 1994 ROD did not specify ARARs for soil. Soil cleanup goals were developed based on future residential land use and leaching to groundwater.

OU2 Groundwater ARARs

The 1999 ROD identified federal MCLs under the SDWA as ARARs for groundwater. Cleanup goals were based on the MCLs, and when primary MCLs were unavailable, secondary MCLs or other TBC criteria were used. Cleanup levels from the ROD were compared to current SDWA MCLs (Table G-2). There have been no changes to the primary MCLs for the eight COCs for which MCLs were used as

cleanup goals in the 1999 ROD, except that an MCL is no longer available for nickel. No new MCLs have been promulgated for the other four COCs.

Table G-2: Previous and Current ARARs for OU2 Groundwater COCs

COC	1999 OU2 ROD ARAR[a] (µg/L)	Current ARAR (µg/L)[a]	ARAR Change
Aluminum	NA	NA	None
Beryllium	4	4	None
Cadmium	5	5	None
Manganese	NA	NA	None
Nickel	100	100	NA
Lead	15	15	None
Iron	NA	NA	NA
Nitrate/Nitrite	1,000 (MCL for nitrite)	1,000	None
Alpha-BHC	NA	NA	NA
Lindane	0.2	0.2	None
Endrin	2	2	None
Dinoseb	7	7	None

Notes:

a. Based on the SWDA primary MCL. Current SDWA standards can be found at: https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants (accessed 6/16/2016).

NA - Cleanup goal is based on TBC criteria.

OU2 Soil and Sediment ARARs

The 1999 ROD did not specify ARARs for soil and sediment. Risk-based cleanup goals for soil and sediment COCs were developed based on future residential land use and also for the protection of ecological receptors.

APPENDIX H – DETAILED DATA ANALYSIS

OU1

Remedy Performance

The PRP measures the depth to groundwater quarterly to calculate groundwater flow direction in the shallow aquifer. The results over the last five years demonstrate that groundwater flow in the shallow aquifer is to the southeast, which is consistent with historical interpretations. The PRP monitors natural attenuation of residual groundwater contamination by sampling piezometer AP-03 and monitoring wells MW-5D, MW-10S and MW-12 on an annual basis for pesticides and VOCs. The results of the monitoring data for this FYR period indicate that the remedy is working as intended as COC concentrations show a generalized decline.

According to the 2000 AROD, the F&G system should direct about 93 percent of contaminated groundwater through a GAC treatment medium. The F&G groundwater treatment technology uses natural hydraulic gradients to drive contaminated groundwater in the shallow aquifer through an in-situ treatment system. The PRP contractor evaluates the treatment system performance on a semiannual basis by collecting water samples from piezometer SP-01 (system influent), the top of the primary reactor (primary effluent), the top of the series reactor (series effluent) and piezometer SP-02 (system effluent). A summary of the data and a map showing the locations of the monitoring locations are included in Figure H-1.

The samples collected from SP-01 during the review period routinely showed detectable alpha-BHC and beta-BHC above performance standards, while other COCs were detected below performance standards (Table H-1). These results are expected because SP-01 represents groundwater prior to treatment. The results collected from the system effluent (SP-02) and the top of the primary and series reactors indicated that COCs were often below detection or were detected well below performance standards. These results indicate the F&G system is effectively treating groundwater.

The OU1 remedy is functioning as intended by reducing groundwater contaminant concentrations. However, in response to the 2012 FYR recommendations, the PRP initiated additional investigations in 2013 to potentially enhance the remedy to reduce the treatment timeframe. The data associated with these investigations are summarized in the section below.

Ongoing Remedy Optimization Investigations

Due to the presence of residual groundwater contamination above cleanup levels at MW-10S (located upgradient of the barrier wall) (Table H-2), additional data has been collected as part of a pilot study initiated by the PRP in 2013. This data is currently being evaluated to optimize remedy to reduce treatment timeframe. To enhance the natural degradation of pesticides in groundwater, the PRP applied 2,000 pounds of EHC™ to subsurface soil near MW-10S in May 2013. The groundwater data from 2015 and 2016 show that concentrations remain above performance standards near MW-10S. Figures H-2 and H-3 show concentration trends for alpha-BHC and xylene over time. The PRP evaluated total BHC trends (Table H-3) in August 2015, including the sum of the alpha-BHC, beta-BHC, gamma-BHC and delta-BHC isomers. The highest total BHC concentration (56.42 µg/L) was reported in MW-10D, located 175 feet north and upgradient of the hydraulic barrier wall, in 2015. The total BHC

concentration reported for deeper well MW-10D was significantly higher than the historical total BHC concentrations reported for shallow well MW-10S. The total depths of wells MW-10D and MW-10S are 28 and 19 feet below ground surface, respectively. The PRP indicated that the higher concentrations in well MW-10D may be indicative of residual pesticide-impacted soils upgradient of this well.

The PRP completed further evaluations in May 2016 to further delineate any residual pesticide-impacted soils upgradient of MW-10D to include installing and developing 10 temporary wells (TW-1 through TW-10) and collecting of one soil and one groundwater sample at each of the 10 temporary well locations. The PRP reported in the August 2016 Groundwater Investigation Progress Report that BHCs, DDT, DDD and toxaphene were detected at elevated concentrations in soil at TW-2 and TW-9 and in most of the temporary wells. TW-9 and TW-10 exhibited the highest concentrations of BHCs and DDT, 71.9 µg/Land 72.4 µg/L, respectively (Table H-4). Based on these results, the PRP contractor is currently collecting additional data to further delineate the extent of the area requiring active remediation.

OU2 Groundwater

The previous FYR recommended optimizing the groundwater remedy to achieve groundwater cleanup levels for COCs still exceeding performance goals (Table H-5). Therefore, the data included in this review are data collected as part of the ongoing pilot study from 2011 to 2017 to determine if in-situ chemical reduction is effective to enhance MNA of groundwater contaminants.

Although the groundwater plume has stabilized and is decreasing in size due to the excavation of contaminated soils and sediments in 2006 dinoseb and nitrate/nitrite remain in groundwater above the ROD cleanup goals within the residual plume (Figure H-4). The plume does not appear to be migrating off site. The EPA initiated a treatability pilot study in 2014 using in-situ chemical reduction to enhance MNA in addressing the residual groundwater contamination. The EPA is reviewing the collected data to assess the effectiveness of the technology to address the remaining contamination.

Preliminary results of the ongoing pilot study show that dinoseb appeared to be fluctuating with a reduction observed at monitor well location MARMW02SH between August and September 2016 almost below the ROD cleanup level (Figure H-5). However, in January 2017 an increase was observed MARMW02SH. The data (Table H-5) show a steady increase of dinoseb and nitrate in location MARMW08SH starting in February 2015 (Figure H-5 and Figure H-6, respectively). Due to the presence of dinoseb and nitrate above the cleanup goals, institutional controls may be warranted to prevent future use of groundwater.

Table H-1: Summary of OU1 Treatment System Analytical Results

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	—	**0.030**	**0.10**	**0.20**	**0.77**	**0.54**	**2.5**	**700**	**10,000**
Primary Reactor	09/01/98	NA	NA	NA	NA	NA	NA	NA	NA
Primary Reactor	04/01/99	NA	NA	NA	NA	NA	NA	NA	NA
Primary Reactor	05/01/00	NA	NA	NA	NA	NA	NA	NA	NA
Primary Reactor	06/02/00	NS	NS	NS	NS	NS	NS	NS	NS
Primary Reactor	09/25/00	NS	NS	NS	NS	NS	NS	NS	NS
Primary Reactor	12/26/00	<0.020	<0.020	<0.020	<0.020	<0.020	<1.0	<1.0	<1.0
Primary Reactor	03/28/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
Primary Reactor	07/01/01	NA	NA	NA	NA	NA	NA	NA	NA
Primary Reactor	09/19/01	NS	NS	NS	NS	NS	NS	NS	NS
Primary Reactor	12/20/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
Primary Reactor	06/05/02	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
Primary Reactor	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
Primary Reactor	01/16/03	<0.0050	<0.010	<0.010	<0.010	<0.020	<0.020	<1.1	<1.1
Primary Reactor	06/30/03	**0.050**	0.070	0.066	<0.050	<0.10	<0.50	60	550
Primary Reactor	09/25/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	12/10/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	06/15/04	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	12/16/04	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	06/07/05	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	12/29/05	<0.0050	<0.010	<0.050	<0.050	<0.10	<1.0	<5.0	21
Primary Reactor	04/17/06	**0.16**	0.064	<0.050	<0.050	<0.10	<0.50	8.9	53
Primary Reactor	06/05/06	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Primary Reactor	12/13/06	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	06/12/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	0.43 J
Primary Reactor	12/19/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	06/11/08	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.24 I	1.1 I
Primary Reactor	12/18/08	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	06/15/09	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	12/16/09	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	06/22/10	<0.0023	<0.0030	0.012	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	12/20/10	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Primary Reactor	06/14/11	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.23 I	2.4
Primary Reactor	12/20/11	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.40
Primary Reactor	06/27/12	<0.0010	<0.0011	<0.00094	<0.0016	<0.0014	<0.053	<0.20	<0.22
Primary Reactor	12/20/12	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.22
Primary Reactor	06/18/13	<0.00098	<0.0011	<0.00092	<0.0016	<0.0014	<0.051	<0.20	<0.22
Primary Reactor	12/02/13	<0.00097	<0.0011	<0.00091	0.0026 I	<0.0014	<0.051	<0.20	<0.22
Primary Reactor	06/16/14	0.0017 I	<0.0011	0.0056	0.0047 I	<0.014	<0.051	<0.20	<0.22
Primary Reactor	12/17/14	<0.0021	<0.0078	<0.0022	<0.0067	<0.0049	<0.0080	<0.50	0.66 I
Primary Reactor	06/02/15	<0.0020	<0.0076	<0.0021	<0.0064	<0.0047	<0.0080	<0.50	<0.50

Table H-1: Summary of OU1 Treatment System Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal		**0.030**	**0.10**	**0.20**	**0.77**	**0.54**	**3.9**	**700**	**10,000**
Primary Reactor	12/08/15	<0.0020	<0.0076	<0.0021	<0.0084	<0.0047	<0.0080	<0.50	<0.50
Primary Reactor	07/28/16	<0.0024	<0.0028	<0.0016	<0.0041	<0.0042	<1.8	<0.50	<0.50
Series Reactor	09/01/98	NA	NA	NA	NA	NA	NA	NA	NA
Series Reactor	04/01/99	NA	NA	NA	NA	NA	NA	NA	NA
Series Reactor	05/01/00	NA	NA	NA	NA	NA	NA	NA	NA
Series Reactor	06/02/00	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	09/25/00	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	12/26/00	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	03/28/01	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	07/01/01	NA	NA	NA	NA	NA	NA	NA	NA
Series Reactor	09/19/01	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	12/20/01	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/05/02	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	01/16/03	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/30/03	**0.041**	0.056	<0.050	<0.050	<0.10	<0.50	5.1	79
Series Reactor	09/25/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
Series Reactor	12/10/03	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/15/04	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	12/16/04	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/07/05	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	12/29/05	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	04/17/06	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/05/06	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	12/13/06	NS	NS	NS	NS	NS	NS	NS	NS
Series Reactor	06/12/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.70	3.6
Series Reactor	12/18/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Series Reactor	06/11/08	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	0.84 I
Series Reactor	12/18/08	<0.0023	0.0035 I	<0.0024	<0.0016	<0.0020	<0.050	0.33 I	0.59 I
Series Reactor	06/15/09	0.0064 I	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Series Reactor	12/16/09	0.0049 I	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Series Reactor	06/21/10	0.0074 I	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
Series Reactor	12/20/10	<0.0023	<0.0030	<0.0024	0.0042 I	<0.0020	<0.050	<0.20	0.92 I
Series Reactor	06/14/11	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	0.096 I	<0.20	<0.40
Series Reactor	12/20/11	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.40
Series Reactor	06/27/12	<0.00099	<0.0011	<0.00093	<0.0016	<0.0014	<0.052	<0.20	<0.22
Series Reactor	12/20/12	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.22
Series Reactor	06/18/13	<0.00098	<0.0011	<0.00092	<0.0016	<0.0014	<0.051	<0.20	<0.22
Series Reactor	12/02/13	<0.00098	<0.0011	<0.00092	<0.0016	<0.0014	<0.050	0.37 I	1.7

Table H-1: Summary of OU1 Treatment System Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	—	**0.030**	**0.10**	**0.20**	**0.77**	**0.55**	**3.9**	**700**	**10,000**
Series Reactor	06/16/14	0.0046	0.0036 I	<0.00091	<0.0016	0.017 I	<0.051	<0.20	<0.22
Series Reactor	12/17/14	<0.0020	<0.0077	<0.0021	<0.0086	<0.0048	<0.0080	<0.50	1.3
Series Reactor	06/02/15	<0.0020	<0.0076	<0.0021	<0.0084	<0.0047	<0.0080	<0.50	<0.50
Series Reactor	12/08/15	<0.0022	<0.0085	<0.0023	<0.0095	<0.0053	<0.0080	<0.50	<0.50
Series Reactor	07/28/16	<0.0024	<0.0027	<0.0016	<0.0040	<0.0042	<1.8	<0.50	<0.50
SP-01	09/01/98	NA	NA	NA	NA	NA	NA	NA	NA
SP-01	04/01/99	NA	NA	NA	NA	NA	NA	NA	NA
SP-01	05/01/00	NA	NA	NA	NA	NA	NA	NA	NA
SP-01	06/02/00	**1.0**	**1.2**	**0.46**	<1.0	<1.0	<0.50	440	990
SP-01	09/25/00	**0.54**	**1.2**	<0.50	<1.0	<1.0	<0.50	230	300
SP-01	12/26/00	**0.41**	**0.57**	0.10 J	0.30	<0.10	<0.50	150	1,400
SP-01	03/28/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	170	880
SP-01	07/01/01	NA	NA	NA	NA	NA	NA	NA	NA
SP-01	09/19/01	**0.34**	<0.010	<0.010	<0.020	<0.020	<0.50	410	1,200
SP-01	12/20/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	420	1,100
SP-01	06/05/02	**0.77**	**0.64**	<0.050	<0.10	<0.10	<0.50	510	3,700
SP-01	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
SP-01	01/16/03	**0.23**	**0.28**	<0.010	<0.010	<0.020	<0.020	200	510
SP-01	06/30/03	**0.041**	**0.21**	0.092	<0.050	<0.10	<0.50	130	1,300
SP-01	09/25/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	28	300
SP-01	12/10/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	110	310
SP-01	06/16/04	**0.040**	<0.020	<0.10	<0.10	<0.20	<0.50	26	210
SP-01	12/16/04	<0.010	<0.020	<0.10	<0.10	<0.20	<0.50	34	80
SP-01	06/07/05	**0.065**	<0.010	<0.050	<0.050	<0.10	<0.50	120	640
SP-01	12/29/05	**0.19**	**0.17**	**0.21**	<0.25	<0.50	<1.0	150	710
SP-01	04/17/06	**1.2**	<0.010	**0.66**	<0.050	<0.10	<0.50	320	1,700
SP-01	06/05/06	**1.0**	**0.38**	<0.50	<0.50	<1.0	NA	120	1,000
SP-01	12/13/06	**0.078**	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	1.7	0.64 J
SP-01	06/12/07	**0.16**	<0.0060	**1.3**	0.58	<0.0040	<0.050	<0.20	<0.40
SP-01	12/19/07	**0.13**	**0.21**	<0.0048	<0.0032	<0.0040	<0.050	<0.20	<0.40
SP-01	06/11/08	**0.12**	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-01	12/18/08	**0.19**	<0.0030	0.13	<0.0016	<0.0020	<0.050	120	410
SP-01	06/15/09	**0.25**	**0.16**	<0.0024	0.44	<0.0020	<0.050	62	470
SP-01	12/16/09	**0.17**	**0.11**	<0.0024	<0.0016	<0.0020	<0.050	26	28
SP-01	06/22/10	**0.23**	0.068	**0.46**	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-01	12/20/10	**0.14**	<0.0030	<0.0024	0.24	<0.0020	<0.050	<0.20	<0.40
SP-01	06/14/11	**0.32**	**0.38**	<0.0024	0.61	0.16	<0.050	40	370
SP-01	12/20/11	**0.25**	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.40
SP-01	06/27/12	**0.29**	**0.16**	0.10	0.33	<0.0015	<0.052	<0.20	4.0

Table H-1: Summary of OU1 Treatment System Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	—	0.030	0.10	0.20	0.77	0.54	3.9	700	10,000
SP-01	12/20/12	**0.16**	**0.14**	<0.00091	<0.0016	<0.0014	<0.050	4.2	37
SP-01	06/18/13	**0.17**	**0.16**	<0.00093	<0.0016	<0.0014	<0.051	9.8	120
SP-01	12/02/13	**0.13**	<0.0011	<0.00092	<0.0016	<0.0014	<0.050	0.31 J	<0.22
SP-01	03/03/14	**0.19**	<0.0011	<0.00094	<0.0016	<0.0014	NA	NA	NA
SP-01	06/16/14	**0.12**	**0.12**	<0.00091	0.24	<0.014	<0.050	30	480
SP-01	12/17/14	**0.21**	**0.28**	0.17	0.33	<0.0049	<0.0080	73	35.7
SP-01	06/02/15	**0.93**	**0.88**	<0.0021	<0.0084	<0.0047	<0.0080	55.7	464
SP-01	12/08/15	**0.069**	<0.0075	<0.0021	<0.0083	<0.0047	<0.0080	4.3	8.4
SP-01	07/28/16	0.020 J	**0.14**	<0.0081	0.19	<0.070	<1.7	8.0	150
SP-02	09/01/98	NA	NA	NA	NA	NA	NA	NA	NA
SP-02	04/01/99	NA	NA	NA	NA	NA	NA	NA	NA
SP-02	05/01/00	NA	NA	NA	NA	NA	NA	NA	NA
SP-02	06/02/00	<0.050	<0.050	<0.050	<0.10	<0.10	<0.50	<1.0	<2.0
SP-02	09/25/00	<0.050	<0.050	<0.050	<0.10	<0.10	<0.50	<1.0	<2.0
SP-02	12/26/00	<0.020	<0.020	<0.020	<0.020	<0.020	<1.0	<1.0	<1.0
SP-02	03/28/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
SP-02	07/01/01	NA	NA	NA	NA	NA	NA	NA	NA
SP-02	09/19/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
SP-02	12/20/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
SP-02	06/05/02	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
SP-02	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
SP-02	01/16/03	<0.0050	<0.010	<0.010	<0.010	<0.020	<0.020	<1.1	2.1
SP-02	06/30/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	1.2	8.6
SP-02	09/25/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
SP-02	12/10/03	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
SP-02	06/15/04	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
SP-02	12/16/04	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
SP-02	06/07/05	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
SP-02	12/29/05	<0.025	0.10	<0.25	<0.25	<0.50	<1.0	<5.0	<5.0
SP-02	04/17/06	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	<1.1	1.3
SP-02	06/05/06	<0.0050	<0.010	<0.050	<0.050	<0.10	<0.50	1.8	5.7
SP-02	12/13/06	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.24 J	0.42 J
SP-02	06/12/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.89	3.8
SP-02	12/18/07	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-02	06/11/08	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.52	2.3
SP-02	12/18/08	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	0.29 J	0.52 J
SP-02	06/15/09	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-02	12/16/09	0.0035 J	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-02	06/21/10	<0.0023	<0.0030	<0.0023	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-02	12/20/10	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	<0.20	<0.40
SP-02	06/14/11	<0.0023	<0.0030	<0.0024	<0.0016	<0.0020	1.2	<0.20	<0.40
SP-02	12/20/11	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.40
SP-02	06/27/12	<0.0010	<0.0011	0.0040	<0.0017	<0.0015	<0.052	<0.20	<0.22
SP-02	12/20/12	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.22
SP-02	06/18/13	<0.00097	<0.0011	<0.00091	<0.0016	<0.0014	<0.050	<0.20	<0.22
SP-02	12/02/13	0.0084	0.015	<0.00091	<0.0016	<0.0014	<0.051	2.9	160
SP-02	03/03/14	0.0033 J	<0.0011	<0.00093	<0.0016	<0.0014	NA	<0.20	<0.22
SP-02	06/16/14	<0.00099	<0.0011	<0.00093	<0.0016	<0.014	<0.052	<0.20	<0.22
SP-02	12/17/14	0.025	0.027	0.023	0.016	<0.0048	<0.0080	107	614
SP-02	06/02/15	<0.0020	<0.0076	<0.0021	<0.0085	<0.0048	<0.0080	<0.50	<0.50
SP-02	12/08/15	<0.0021	<0.0079	<0.0022	<0.0088	<0.0049	<0.0080	<0.50	<0.50
SP-02	07/28/16	<0.0024	<0.0028	<0.0016	<0.0041	<0.0042	<1.8	<0.50	<0.50

Table H-2: Summary of OU1 MNA Groundwater Monitoring Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	--	**0.030**	**0.10**	**0.20**	**0.77**	**0.54**	**3.9**	**700**	**10,000**
MW-5D	12/10/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/15/04	0.020	**0.16**	<0.050	<0.050	<0.10	<0.50	5.4	190
MW-5D	12/16/04	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/07/05	<0.0050	0.064	<0.050	<0.050	<0.10	<0.50	<1.1	<1.1
MW-5D	12/29/05	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/06/06	**0.27**	**0.11**	0.020 J	<0.050	<0.10	<0.50	220	1,900
MW-5D	12/13/06	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/12/07	0.011	<0.0030	<0.0023	<0.0016	<0.0020	<0.050	1.0	2.5
MW-5D	12/18/07	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/11/08	**0.13**	<0.0030	0.034	<0.0016	<0.0020	<0.050	3.0	4.5
MW-5D	12/18/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/16/09	**0.13**	<0.0030	<0.0024	<0.0016	<0.0020	<0.050	15	18
MW-5D	12/16/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/21/10	**0.28**	<0.0030	**0.90**	<0.0016	<0.0020	<0.050	27	2.7
MW-5D	12/20/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/14/11	**0.15**	**0.16**	<0.0024	<0.0016	<0.0020	<0.050	7.5	2.1
MW-5D	12/20/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/27/12	**0.26**	**0.15**	<0.00094	<0.0016	<0.0014	<0.051	98	27
MW-5D	12/20/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/18/13	**0.031**	0.023	0.019	<0.0016	<0.0014	<0.051	40	130
MW-5D	12/02/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	06/17/14	0.011	0.0075	<0.00092	0.0053 I	<0.014	<0.050	9.2	61
MW-5D	12/17/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-5D	03/02/15	<0.0020	<0.0075	<0.0021	<0.0084	<0.0047	NA	NA	NA
MW-5D	06/03/15	**0.065**	0.062	<0.0022	<0.0091	<0.0051	<0.0080	180	1,190
MW-5D	07/28/16	0.019	0.010	<0.0016	<0.0041	<0.0042	<1.8	<0.50	<0.50
MW-10S	09/01/98	**3.5**	**2.6**	**6.4**	<0.77	<0.54	**710**	**5,800**	**47,000**
MW-10S	04/01/99	**2.8**	**3.5**	**5.8**	<0.20	<0.20	**700**	**5,700**	**42,000**
MW-10S	05/01/00	**2.9**	**6.5**	**6.6**	<2.0	**0.64 J**	**1,400**	**7,700 B**	**60,000**
MW-10S	06/02/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	09/25/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	12/26/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	03/28/01	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	07/01/01	**1.1**	<0.010	**12**	<0.020	<0.020	**750**	**6,900**	**54,000**
MW-10S	09/19/01	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	12/20/01	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/05/02	**3.7**	<0.10	**6.5**	<0.20	<0.20	<0.50	**7,900**	**59,000**
MW-10S	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	01/16/03	NS	NS	NS	NS	NS	NS	NS	NS

Table H-2: Summary of OU1 MNA Groundwater Monitoring Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	–	**0.030**	**0.10**	**0.20**	**0.77**	**0.54**	**3.9**	**700**	**10,000**
MW-10S	06/30/03	**1.1**	<0.10	**1.6**	<0.050	<0.10	**280**	**4,300**	**37,000**
MW-10S	09/25/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	12/10/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/16/04	**1.5**	<0.10	**4.3**	<0.50	<1.0	**630**	**4,800**	**44,000**
MW-10S	12/16/04	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/07/05	**1.1**	**5.8**	**6.2**	<0.10	<0.20	**280**	**4,800**	**22,000**
MW-10S	12/29/05	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/06/06	**2.6**	<0.50	**7.7**	<2.5	<5.0	**940**	**3,000**	**32,000**
MW-10S	12/13/06	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/12/07	**2.0**	<0.030	**7.7**	<0.016	<0.020	**130**	**2,900**	**30,000**
MW-10S	12/18/07	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/11/08	**2.0**	<0.060	**5.5**	<0.0016	<0.0020	**150**	**4100**	**42,000**
MW-10S	12/18/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/16/09	**1.9**	<0.15	**5.5**	<0.0016	<0.0020	**540**	**4,300**	**39,000**
MW-10S	12/16/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/21/10	**3.4**	<0.0030	**1.6**	<0.0016	<0.0020	**95**	**4,100**	**38,000**
MW-10S	12/20/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/14/11	**2.6**	<0.0030	**6.4**	<0.0016	<0.0020	**1,300**	**4,500**	**31,000**
MW-10S	12/20/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/27/12	**2.4**	<0.0012	**6.0**	**2.4**	<0.0015	**230**	**4,300**	**31,000**
MW-10S	12/20/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	06/18/13	**2.2**	<0.0011	**2.2**	**1.3**	<0.0014	**5.5**	**2,300**	**15,000**
MW-10S	09/11/13	**2.4**	<0.022	**2.9**	<0.032	<0.028	<0.050	**3,700**	**21,000**
MW-10S	12/02/13	**2.2**	<0.0011	<0.00093	**1.1**	<0.0014	**74**	**2,700**	8,400
MW-10S	03/04/14	**1.0**	<0.0011	**1.5**	<0.0016	<0.0014	NA	**940**	5,700
MW-10S	06/17/14	**1.1**	<0.0011	**1.0 J**	**3.7**	**8.0**	**25**	**940**	4,300
MW-10S	12/17/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-10S	03/02/15	**0.040**	0.040	**0.023**	0.69	<0.0047	NA	NA	NA
MW-10S	06/03/15	**4.1**	**0.87**	**5.4**	**1.2**	<0.0051	<0.0080	**2,460**	**12,800**
MW-10S	07/28/16	**2.6**	**0.72**	**0.96**	0.65	<0.43	<1.9	**1,700**	480
MW-10D	03/02/15	**9.9**	**6.0**	**1.9**	<0.0083	<0.0047	NA	NA	NA
MW-10D	06/03/15	**13.6**	**8.5**	**0.92**	<0.0086	<0.0048	NA	NA	NA
MW-12	09/01/98	**0.18**	**1.0**	**0.22**	<0.77	**0.67**	<3.9	<2.0	29
MW-12	04/01/99	<0.25	**1.1**	<0.25	0.39	**0.86**	<0.50	<1.0	<2.0
MW-12	05/01/00	**0.060**	**0.72**	0.17	0.62	0.51	<0.50	<1.0	<3.0
MW-12	06/02/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	09/25/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	12/26/00	NS	NS	NS	NS	NS	NS	NS	NS

Table H-2: Summary of OU1 MNA Groundwater Monitoring Analytical Results (continued)

Location / Sample ID	Sample Date	Pesticides						VOCs	
		alpha-BHC	beta-BHC	gamma-BHC	4,4'-DDD	4,4'-DDT	Methyl Parathion	Ethylbenzene	Xylenes
		Concentrations in micrograms per liter (ug/L)							
Cleanup Goal	–	**0.030**	**0.10**	**0.20**	**0.77**	**0.54**	**3.9**	**700**	**10,000**
MW-12	03/28/01	<0.010	<0.010	<0.010	<0.020	<0.020	<0.50	<1.1	<1.1
MW-12	07/01/01	<0.010	**0.67**	0.14	<0.020	<0.020	<0.50	<1.1	2.3
MW-12	09/19/01	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	12/20/01	**0.040**	<0.020	0.090	<0.040	<0.040	<0.50	<1.1	<1.1
MW-12	06/05/02	<0.020	<0.020	<0.020	<0.040	0.22	1.8	<1.1	<1.1
MW-12	08/01/02	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	01/16/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	07/01/03	<0.010	**0.37**	<0.10	<0.10	<0.20	<0.50	<1.1	3.0
MW-12	09/25/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	12/10/03	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/17/04	<0.010	**0.25**	<0.10	<0.10	<0.20	<0.50	<1.1	<1.1
MW-12	12/16/04	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/07/05	0.012	**0.52**	0.037	<0.050	<0.10	<0.50	<1.1	<1.1
MW-12	12/29/05	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/06/06	0.022	**0.27**	<0.25	<0.25	<0.50	<0.50	<1.1	<1.1
MW-12	12/13/06	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/12/07	0.022	**0.91**	<0.0096	<0.0064	<0.0080	<0.050	0.27 J	1.2 J
MW-12	12/18/07	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/12/08	0.0062 I	**0.11**	<0.0024	<0.0016	0.19	<0.050	0.49 I	2.5
MW-12	12/18/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/15/09	0.029	**0.18**	0.031	<0.0016	<0.0020	<0.050	<0.20	<0.40
MW-12	12/16/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/21/10	**0.032**	0.10	0.14	<0.0016	<0.0020	<0.050	<0.20	<0.40
MW-12	12/20/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/14/11	0.018	**0.19**	0.064	<0.0016	0.15	NA	NA	NA
MW-12	06/16/11	NA	NA	NA	NA	NA	<0.050	<0.20	<0.40
MW-12	12/20/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/27/12	0.027	**0.12**	0.099	<0.0016	0.051	<0.051	<0.20	1.3
MW-12	12/20/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/18/13	0.020	**0.13**	0.020	<0.0016	<0.0014	<0.051	<0.20	<0.22
MW-12	12/02/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/16/14	0.011	**0.11**	0.022	0.067	<0.015	<0.051	<0.20	<0.22
MW-12	12/17/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	06/03/15	0.025	**0.23**	0.051	<0.0084	<0.0047	<0.0080	<0.50	<0.50
MW-12	07/28/16	0.013	0.091	0.020	0.048	0.097	<1.9	<0.50	<0.50
MW-15S	06/18/13	**0.42**	**0.50**	**0.25**	<0.0016	<0.0014	<0.051	<0.20	<0.22
MW-15S	12/02/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-15S	12/17/14	**0.86**	**0.64**	**0.54**	<0.0084	<0.0047	<0.0080	<0.50	<0.50
MW-15S	06/03/15	**0.20**	**0.32**	0.12	0.014	<0.0048	<0.0080	<0.50	<0.50
MW-15S	07/28/16	**0.35**	**0.48**	0.15	0.092	<0.021	<1.8	<0.50	<0.50

Notes:
NA - sample was not analyzed.
NS – well was not sampled.
Source: 2015 Annual System Performance Monitoring Report. Marzone Superfund Site Tifton, Georgia. Prepared by ARCADIS January 2016.

Table H-3: 2015 Pilot Test Total BHC Concentrations in OU1 Groundwater

Location / Sample I.D.	Sample Date	Pesticides							TOC (mg/L)
		alpha-BHC	beta-BHC	delta-BHC	gamma-BHC	Total BHCs	4,4'-DDD	4,4'-DDT	
		Concentrations in micrograms per liter (µg/L)							
GWCL	–	0.03	0.1	–	0.2	–	0.77	0.64	–
AP-01	03/02/15	0.0047 I	<0.0075	0.037	<0.0021	0.0417	<0.0084	<0.0047	3.8
AP-02	03/02/15	**2.3**	**1.3**	2.5	**1.6**	7.5	**1.0**	<0.0047	1.5
MW-3S	03/02/15	**0.88**	<0.0076	0.33	**0.33**	1.54	**1.3**	<0.0047	3.7
MW-3S	06/02/15	**2.8**	<0.0077	<0.0046	<0.0021	2.8	**8.8**	<0.0048	7.1
MW-3D	03/02/15	**2.8**	<0.0076	1.3	**3.3**	7.4	<0.0084	**2.0**	43.9
MW-3D	06/02/15	**5.2**	<0.0076	<0.0046	**5.2**	10.4	<0.0086	<0.0048	51.7
MW-5D	03/02/15	<0.0020	<0.0075	<0.0045	<0.0021	ND	<0.0084	<0.0047	6.9
MW-5D	06/02/15	**0.066**	0.062	0.13	<0.0022	0.257	<0.0091	<0.0051	8.8
MW-10S	03/02/15	**0.040**	0.040	0.12	0.023	0.223	0.69	<0.0047	21.7
MW-10S	06/02/15	**4.1**	**0.87**	<0.049	**5.4**	10.37	<0.0051	<0.0051	15.1
MW-10D	03/02/15	**9.9**	**6.0**	24.3	**1.8**	42.1	<0.0083	<0.0047	9.2
MW-10D	06/02/15	**18.6**	**8.6**	33.4	**0.82**	56.42	<0.0086	<0.0048	17.3
MW-12	06/02/15	0.025	**0.28**	0.15	0.051	0.456	<0.0084	<0.0047	NA
MW-15S	06/02/15	**0.2**	**0.32**	0.51	0.12	1.15	0.014	<0.0048	NA

LEGEND

gamma-BHC	= Lindane
GWCL	= Site-specific groundwater cleanup level
mg/L	= Milligrams per liter
ND	= Not detected
TOC	= Total organic carbon
<Number	= Not detected at or above this stated laboratory reporting limit
NA	= Not analyzed

NOTES:

(1) Results in bold font indicate the concentration exceeds the GWCL for that specific compound.

Table H-4: OU1 2015 Supplemental Soil and Groundwater Evaluation

Location / Sample ID	Sample Date	alpha-BHC	beta-BHC	Lindane	delta-BHC	Total BHC	4,4'-DDD	4,4'-DDT	Toxaphene
		Concentrations in micrograms per kilograms (ug/kg)							
TW-1	05/09/16	<0.21	<2.1	<0.19	0.56 J	0.56	180	25	<16
TW-2	05/10/16	530 J	<340	1,200	810 J	2,540	6,100	14,000	240,000
TW-3	05/10/16	<0.19	0.67 J	0.32 J	1.1	2.09	9.6	1.3 J	<49
TW-4	05/10/16	1.6	12	<0.19	12	25.6	<0.36	1.1 J	<15
TW-5	05/10/16	<0.19	<0.34	<0.19	<1.0	ND	1.8 J	<0.50	<76
TW-6	05/10/16	0.70 J	2.2	<0.19	1.0	3.9	93	<1.0	<140
TW-7	05/10/16	<0.19	<0.33	<0.19	0.63 J	0.63	<0.37	6.0	<16
TW-8	05/10/16	0.86 J [1.1]	0.68 J [<0.52]	<0.20 [<0.20]	<0.54 [0.70 J]	1.54 [1.8]	90 [33]	22 [<5.2]	<17 [<17]
TW-9	05/11/16	850 J	410 J	2,100	1,100	4,460	8,700	34,000	320,000
TW-10	05/11/16	<9.7	<17	<9.7	<26	ND	410	6,100	16,000
Location / Sample ID	Sample Date	alpha-BHC	beta-BHC	Lindane	delta-BHC	Total BHC	4,4'-DDD	4,4'-DDT	Toxaphene
		Concentrations in micrograms per liter (ug/L)							
TW-1	05/11/16	6.9	1.5	17	9.6	35	0.73	<0.085	<4.9
TW-2	05/11/16	2.7	0.46	7.9	3.1	14.2	0.5	1.8	<2.4
TW-3	05/11/16	7.3	3.1	6.7	4.7	21.8	<1.4	3.6	<4.9
TW-4	05/11/16	2.6 [2.5]	1.6 [1.4]	1.7 [1.6]	1.8 [1.1]	7.7 [6.6]	4.6 [2.4]	2.3 [2.4]	190 [170]
TW-5	05/11/16	0.013	0.048	0.010	<0.020	0.071	0.63	<0.13	<0.24
TW-6	05/11/16	0.14	<0.23	0.084	<0.11	0.224	10	2.1	<2.4
TW-7	05/11/16	4.5	2.1	0.59	0.64	7.83	8.2	<3.3	140
TW-8	05/12/16	3.0	2.3	0.23	<0.30	5.53	8.7	<1.5	<4.8
TW-9	05/12/16	12	7.9	29	23	71.9	2.6	5.9	<4.9
TW-10	05/12/16	15	9.4	29	19	72.4	<1.8	3.4	<4.8

LEGEND:

BHC = Hexachlorocyclohexane
Lindane = gamma-BHC
DDD = Dichlorodiphenyldichloroethane
DDT = Dichlorodiphenyltrichloroethane
J = Estimated value between the method detection limit and the laboratory reporting limit.
ND = Isomer concentratons were below the laboratory reporting limit.
[Number] = Duplicate sample result

Table H-5: Summary of OU2 Pilot Study Results (2010 through 2017)

Groundwater Results
ZVI Pilot Study Performance Monitoring
Marzone Site, Tifton, Tift County, Georgia

Analyte	ROD Cleanup Level	MARMW02SH									
		2009-10	6/4/14	6/18/14	7/15/14	8/12/14	11/11/14	2/19/15	8/26/15	9/14/16	1/17/17
		Pre-Treatment Mean	2 weeks Post-Injection	1 Month Post-Injection	2 Months Post-Injection	3 Months Post-Injection	6 Months Post-Injection	9 Months Post-Injection	15 Months Post-Injection	28 Months Post-Injection	32 Months Post-Injection
Field Parameters											
Temperature (°C)	NA	21.70	--	--	23.65	25.73	23.98	--	27.22	26.29	21.72
Conductivity (mS/cm)	NA	0.803	--	--	6.130	0.567	0.447	--	0.519	0.229	0.316
Dissolved Oxygen (mg/L)	NA	1.14	--	--	0.39	1.17	0.23	--	0.71	0.47	0.48
pH	NA	3.29	--	--	3.19	3.72	3.99	--	4.61	6.94	6.31
ORP (mV)	NA	368.5	--	--	-0.6	220.2	24.2	--	-46.2	-13.4	45.8
Turbidity (NTU)	NA	4.3	--	--	11.9	9.3	9.7	--	8.4	11.3	8.1
Classical/Nutrient Analytes											
Nitrate/Nitrite as N (mg/L)	1*	19	0.5	0.48	0.95	0.53	1.1	4.4	2.6	0.43	1.3
Herbicides (µg/L)											
Dinoseb	7	240	2.8NJ	0.25UJ	0.81U	76**	860	3.8	1330	9.2	60.0
Metals (µg/L)											
Aluminum	28702	34250	11000	13000	5500	6100	25000	2100	23000	510	830
Manganese	660	680	1500	2400	2000	1900	3800	350	2600	120	340
		MARMW02SH-DUP									
		2009-10	6/4/14	6/18/14	7/15/14	8/12/14	11/11/14	2/19/15	8/26/15	9/14/16	1/17/17
		Pre-Treatment Mean	2 weeks Post-Injection	1 Month Post-Injection	2 Months Post-Injection	3 Months Post-Injection	6 Months Post-Injection	9 Months Post-Injection	15 Months Post-Injection	28 Months Post-Injection	32 Months Post-Injection
Field Parameters											
Temperature (°C)	NA	21.70	--	--	23.65	25.73	23.98	--	27.22	26.29	21.72
Conductivity (mS/cm)	NA	0.803	--	--	6.130	0.567	0.447	--	0.519	0.229	0.316
Dissolved Oxygen (mg/L)	NA	1.14	--	--	0.39	1.17	0.23	--	0.71	0.47	0.48
pH	NA	3.29	--	--	3.19	3.72	3.99	--	4.61	6.94	6.31
ORP (mV)	NA	368.5	--	--	-0.6	220.2	24.2	--	-46.2	-13.4	45.8
Turbidity (NTU)	NA	4.3	--	--	11.9	9.3	9.7	--	8.4	11.3	8.1
Classical/Nutrient Analytes											
Nitrate/Nitrite as N (mg/L)	1*	20	0.67	0.11	1.4	0.43	2	4.7	2.8	0.53	1.1
Herbicides (µg/L)											
Dinoseb	7	260	21NJ	0.25UJ	0.25U	93J	480J	5.8	1430	9.3	55.0
Metals (µg/L)											
Aluminum	28702	26508	11000	14000	5200	7100	32000	3100	24000	810	760
Manganese	660	529	1500	2300	1900	1900	1300	390	710	130	310
		MARMW08SH									
		2009-10	6/4/14	6/18/14	7/15/14	8/12/14	11/11/14	2/19/15	8/26/15	9/14/16	1/17/17
		Pre-Treatment Mean	2 weeks Post-Injection	1 Month Post-Injection	2 Months Post-Injection	3 Months Post-Injection	6 Months Post-Injection	9 Months Post-Injection	15 Months Post-Injection	28 Months Post-Injection	32 Months Post-Injection
Field Parameters											
Temperature (°C)	NA	23.09	--	--	25.80	23.89	23.88	--	29.42	25.49	23.00
Conductivity (mS/cm)	NA	3.500	--	--	1.182	0.462	0.345	--	0.787	0.188	1.145
Dissolved Oxygen (mg/L)	NA	2.64	--	--	0.34	0.02	0.13	--	0.11	2.82	0.20
pH	NA	4.10	--	--	6.90	8.47	8.00	--	9.12	8.94	8.90
ORP (mV)	NA	324.3	--	--	-43.8	-117.4	-128.2	--	-156.9	-215.8	48.9
Turbidity (NTU)	NA	0.8	--	--	0.5	24.7	134.0	--	8.98	25.00	62.40
Classical/Nutrient Analytes											
Nitrate/Nitrite as N (mg/L)	1*	175	19	13	18	1.5	4.5	4	9.7	28	27
Herbicides (µg/L)											
Dinoseb	7	1470	3.1NJ	1.5UJ	0.25U	0.37U**	1.6J	0.48	39.4	170.0	270.0
Metals (µg/L)											
Aluminum	28702	36000	2400	970	3300	700	12000	1900	1500	1400	3300
Manganese	660	1100	320	140	130.0	8.2	39.0	8.6	17	74	140

NOTES:

ROD = Reported result exceeds ROD Cleanup Level
EPA = No cleanup level is established for the constituent.
MCL = The analyte was not detected at or above the reporting limit
µg/L = Identification of the analyte is acceptable; the reported value is an estimate
mg/L = Record of Decision
(°C) = Degrees Celsius
* = Cleanup level is based on the MCL for Nitrite
** = An internal investigation indicates that dinoseb containers for MARMW02SH-DUP and MARMW08SH were potentially switched in the field. Amended values are presented.
mS/cm = milliSiemens per centimeter
ORP = Oxidation-reduction potential
NTU = nephelometric turbidity units
mV = millivolt
µg/L = micrograms per liter
mg/L = milligrams per liter

Figure H-1: OU1 Remedy Performance Monitoring Locations

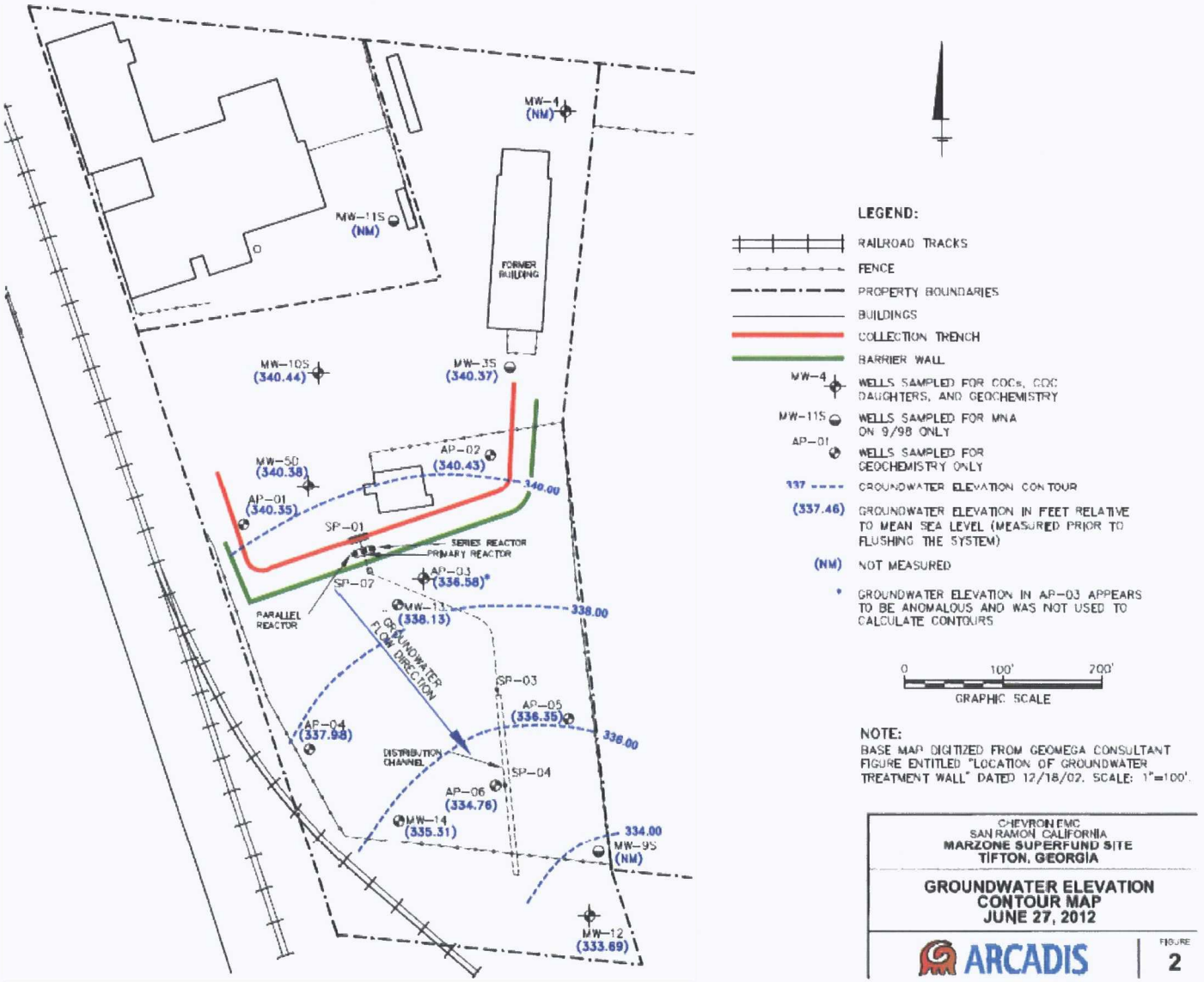


Figure H-2: OU1 Concentrations of alpha-BHC in Well MW-10S (2011 – 2016)

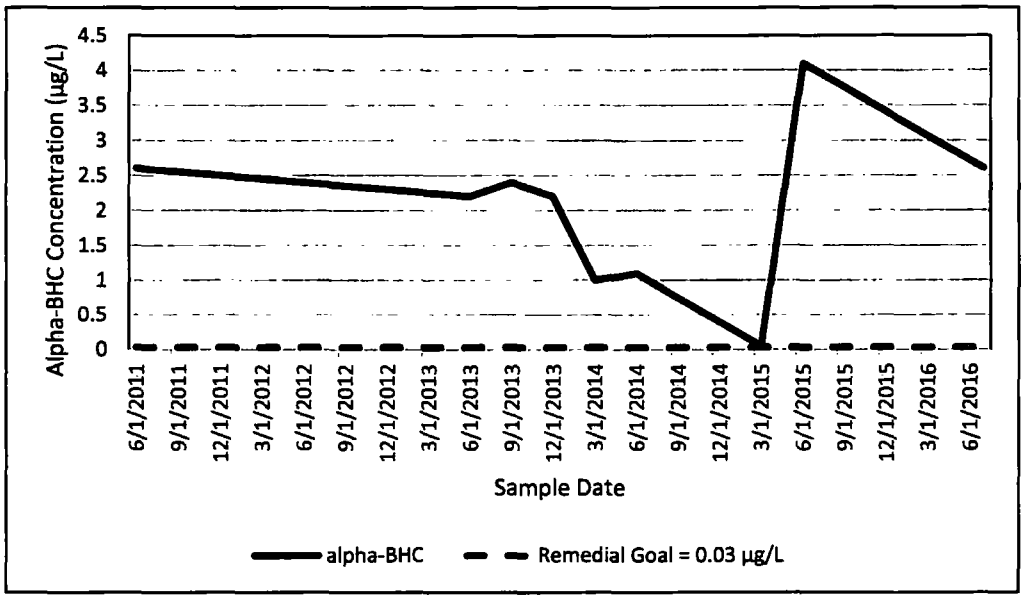


Figure H-3: OU1 Concentrations of Xylenes in Well MW-10S (2011 – 2016)

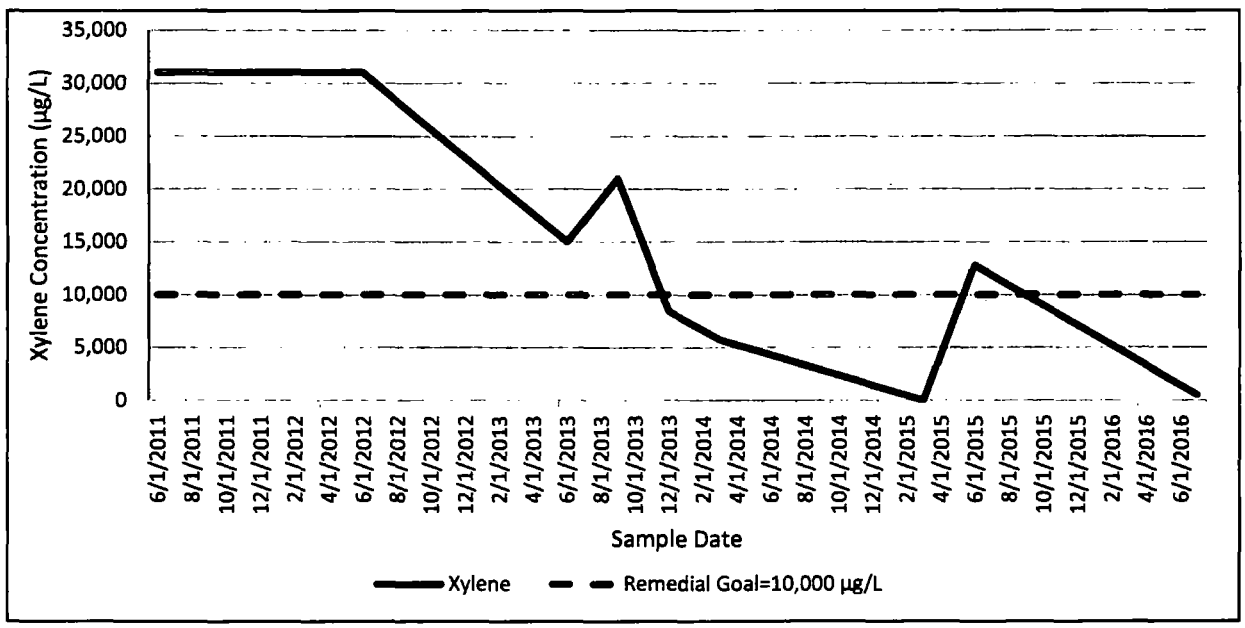


Figure H-4: OU2 Groundwater Plume

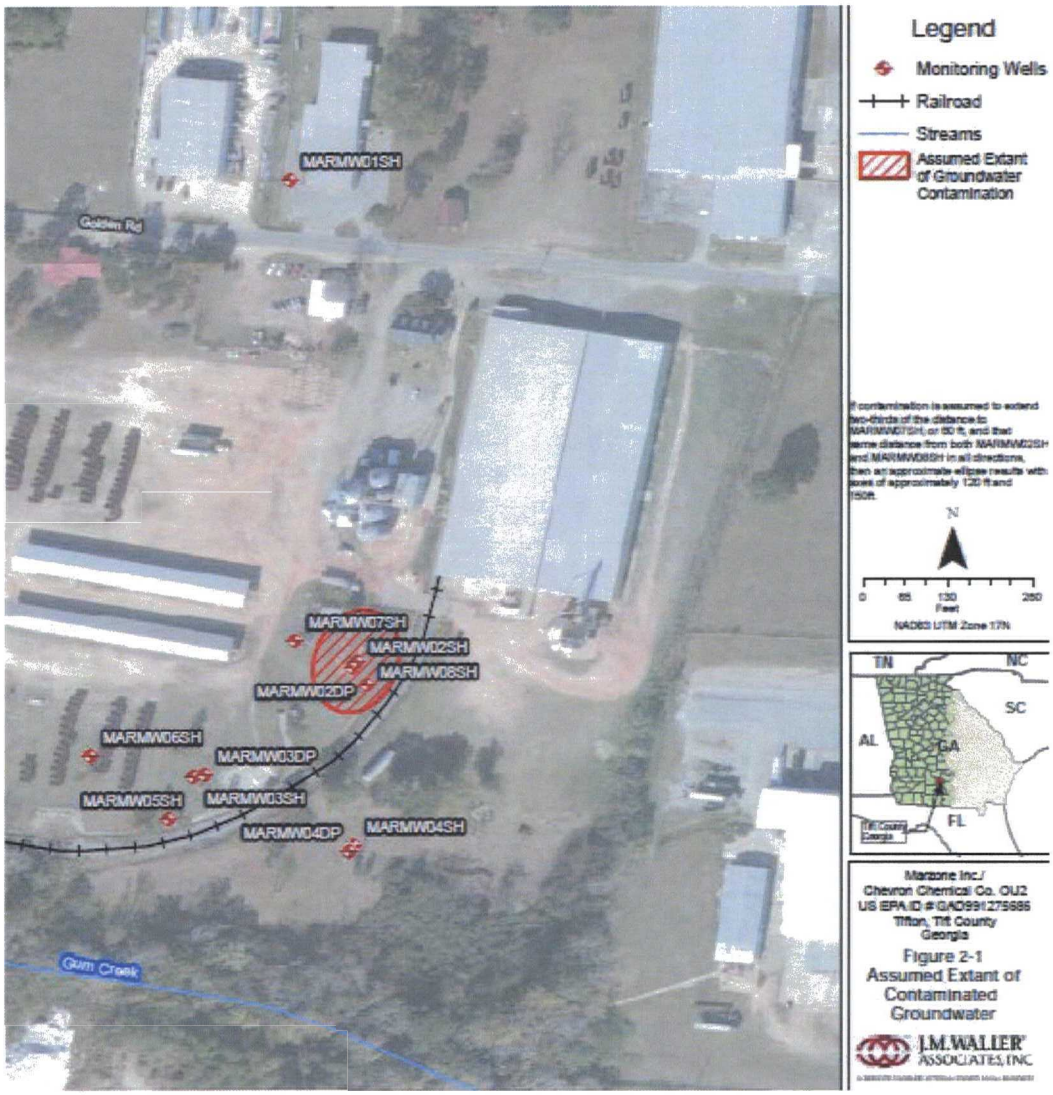


Figure H-5: OU2 Concentrations of Dinoseb Following Pilot Test Injections

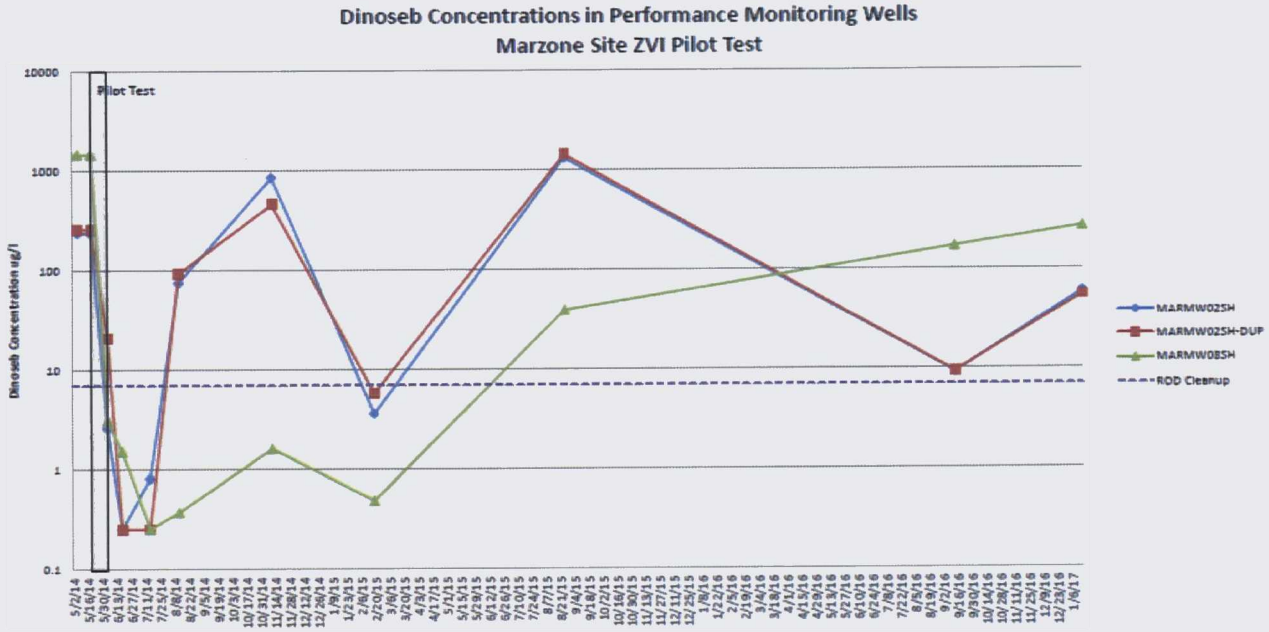
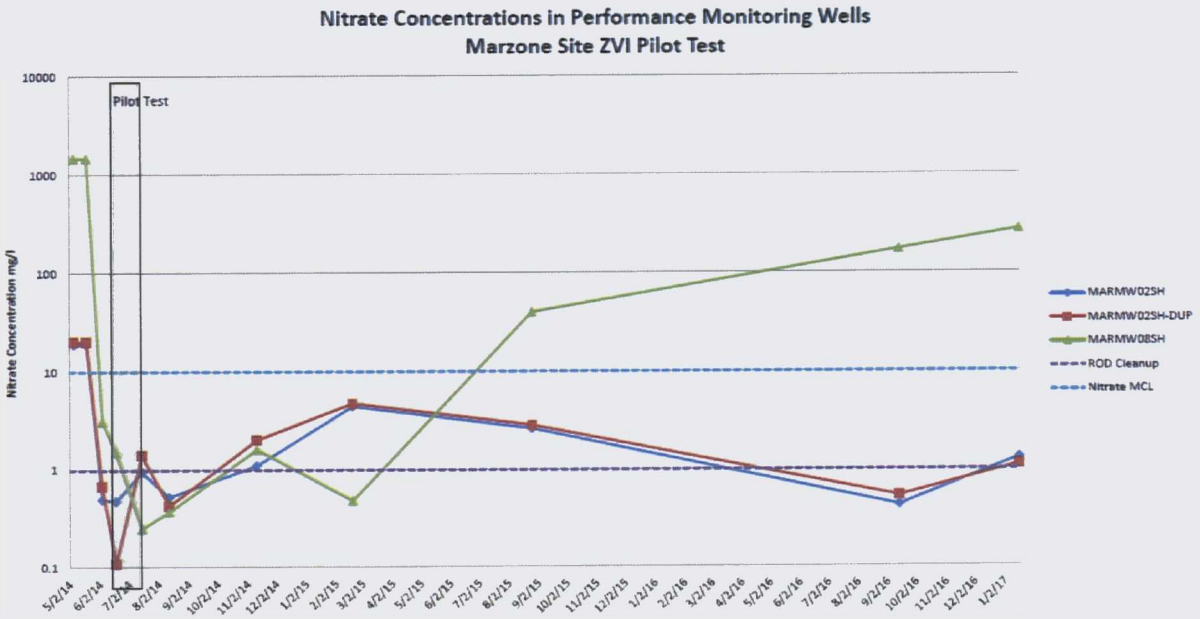


Figure H-6: OU2 Concentrations of Nitrate Following Pilot Test Injections



APPENDIX I – DETAILED TOXICITY REVIEW

Changes in Standards and To-Be-Considered (TBC) Values
Since the last FYR, there have not been any changes to the MCLs for either OU (Appendix G). Although the MCL has not changed for xylene, the toxicity of this compound has been further reviewed by the EPA and the MCL is not considered protective by EPA Region 4. The effect of toxicity value changes on the cleanup goals for the COCs with and without established MCLs is evaluated in the next section.

Changes in Toxicity and Other Contaminant Characteristics
MCLs were not established for all groundwater COCs in OU1 and OU2, therefore, EPA selected health-based levels as the cleanup goals. In addition, the ROD cleanup levels in surface soil at OU1 and surface soil and sediment at OU2 were based on residential exposure. Further, the EPA selected cleanup goals in subsurface soil that are protective of groundwater at OU1. Toxicity values for several COCs have changed since the RODs and in 2014, the EPA updated default exposure assumptions.

To determine if the cleanup goals for soil, sediment and groundwater remain protective for residential use, the cleanup goals were compared to EPA's 2016 regional screening levels (RSLs), since the RSLs incorporate current toxicity values and standard default exposure factors.

The evaluation of OU1 surface soil (Table I-1 and Table I-2) and subsurface soil cleanup levels (Table I-3) and OU2 surface soil and sediment soil cleanup levels (Table I-4 and Table I-5, respectively) demonstrates that except for dioxin in OU1 surface soils, the cleanup levels remain valid as the concentrations are within or below EPA's risk management range of 1×10^{-6} to 1×10^{-4} or below the noncancer hazard quotient (HQ) of 1.0. Toxicity factors for dioxin have changed since the risk assessments were published. On February 17, 2012, the EPA released a new non-cancer toxicity value for dioxin. Based on the current toxicity values for evaluating cancer risk and noncancer effects associated with dioxin, the OU1 dioxin cleanup level is equivalent to a cancer risk greater than 1×10^{-4} and exceeds a non-cancer HQ of 1, based on a residential exposure (Table I-1). Based on industrial exposure, the dioxin cleanup goal is slightly above the HQ of 1 but within EPA's risk management range; however, the post-remediation level achieved for dioxin in surface soil is 0.0002 milligrams per kilogram (mg/ kg) which is below the HQ of 1industrial exposure (Table I-2). The achieved remediation level of 0.0002 mg/kg in surface soil results in a risk within EPA's risk management range and below the noncancer HQ of 1, but for residential use the HQ still exceeds 1. Although the Site is zoned for industrial use, these results indicate that land use restrictions may be warranted for OU1 that prevent residential use of the Site in the future.

Table I-1: Health Evaluation of OU1 Surface Soil Cleanup Levels

COC	1994 ROD Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1×10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Atrazine	3.5	2.4	2,200	1×10^{-6}	0.002
Alpha-BHC	0.12	0.086	510	1×10^{-6}	0.0002
DDD	3.2	2.3	NA	1×10^{-6}	--
DDE	2.28	2.0	NA	1×10^{-6}	--
DDT	2.29	1.9	37	1×10^{-6}	0.06
Dieldrin	0.049	0.034	3.2	1×10^{-6}	0.02

COC	1994 ROD Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Endosulfan II	2.6	NA	470	1 x 10^{-6}	0.006
Heptachlor epoxide	0.085	0.07	1.0	1 x 10^{-6}	0.08
Toxaphene	0.7	0.49	NA	1 x 10^{-6}	--
Organic Compounds					
Dioxin	0.001[d]	4.8 x 10^{-6}	5.1 x 10^{-5}	**2 x 10^{-4}**	**20**

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 6/17/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. The EPA established cleanup levels in the 1994 ROD, except for dioxin, for which the cleanup level was established by the EPA in the 1998 AROD.
NA = toxicity values not established by the EPA
-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.
Bold = noncancer HQ exceeds 1.0 or cancer risk exceeds 1 x 10^{-4}.

Table I-2: Risk Evaluation of Dioxin Cleanup Levels

COC	Cleanup Level (mg/kg)	Industrial RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Cleanup Level	0.001[d]	2.2 x 10^{-5}	7.2 x 10^{-4}	4.5 x 10^{-5}	**1.4**
Level achieved by remediation	0.0002[e]			9.1 x 10^{-6}	0.28
COC	**Cleanup Level (mg/kg)**	**Residential RSL[a] (mg/kg)**		**Cancer Risk[b]**	**Noncancer HQ[c]**
		1 x 10^{-6} Risk	**HQ=1.0**		
Cleanup Level	0.001[d]	4.8 x 10^{-6}	5.1 x 10^{-5}	2.1 x 10^{-4}	**20**
Level achieved by remediation	0.0002[e]			4.2 x 10^{-5}	**3.9**

Notes:

a. Current EPA RSLs, dated May 2016, are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016 (accessed 1/16/2017).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Dioxin concentration ÷ cancer-based RSL) × 10^{-6}

c. Noncancer HQ was calculated using the following equation:
HQ = Dioxin concentration ÷ noncancer-based RSL

d. Established by the EPA in the 1998 AROD.

e. Concentrations achieved as reported in the 1999 Final Construction and Remedial Action Report.

Bold = noncancer HQ exceeds 1.0.

Table I-3: Health Evaluation of OU1 Subsurface Soil Cleanup Levels

COC	Cleanup Level (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Atrazine	0.150	2.4	2,200	6 x 10^{-8}	0.00007
Alpha-BHC	1.142	0.086	510	1 x 10^{-5}	0.002
Beta-BHC	0.547	0.3	NA	2 x 10^{-6}	--
Lindane	0.463	0.57	21	8 x 10^{-7}	0.02
Methyl parathion	4.55	NA	16	--	0.3
Organic Compounds					
Ethylbenzene	57.3	5.8	3,400	1 x 10^{-5}	0.02
Xylene	213	1.7	580	1 x 10^{-4}	0.4

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 6/17/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL
NA = toxicity values not established by the EPA
-- = cancer risk or noncancer HQ could not be calculated, toxicity values not established.

Table I-4: Health Evaluation of OU2 Soil Cleanup Levels

COC	1999 ROD Cleanup Levels (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
Gamma-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
DDD	2.0	2.3	NA	9 x 10^{-7}	--
DDE	1.0	2.0	NA	5 x 10^{-7}	--
DDT	1.0	1.9	37	5 x 10^{-7}	0.03
Toxaphene	0.4	0.49	NA	8 x 10^{-7}	--
Inorganic Compounds					
Copper	20	NA	3,100	--	0.006
Lead	330	400[d]		<400	
Zinc	100	NA	23,000	--	0.004

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 6/17/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. RSL based on the EPA's blood lead model.

NA = toxicity values not established by the EPA.
-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.

Table I-5: Health Evaluation of OU2 Sediment Cleanup Levels

COC	1999 ROD Cleanup Goals (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
Gamma-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
DDD	5.0	2.3	NA	2 x 10^{-6}	--
DDE	5.0	2.0	NA	3 x 10^{-6}	--
DDT	5.0	1.9	37	3 x 10^{-6}	0.1
Toxaphene	3.0	0.49	NA	1 x 10^{-6}	--
Inorganic Compounds					
Copper	20	NA	3,100	--	0.006
Lead	330	400[d]		<400	
Zinc	100	NA	23,000	--	0.004

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 6/17/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. RSL based on the EPA's blood lead model.

NA = toxicity values not established by the EPA.

-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.

The screening-level risk evaluation of groundwater cleanup goals indicates that xylene at OU1 and aluminum and manganese at OU2 are equivalent to a HQ greater than 1.0 (Table I-6 and Table I-7, respectively). According to the data review (Appendix H), the concentrations shown in the monitoring data also exceed the more stringent RSLs. The RSL comparison reveals that the xylene MCL may not be protective of human health. Based on the current toxicity assessment and standard drinking water and showering exposure assumptions, the EPA Region 4 recommends a concentration of 3,500 µg/L as a health-protective remedial level for total xylenes in groundwater. Although the Region 4 recommended value of 3,500 µg/L is more stringent than the current federal MCL, the remedy remains protective for OU1 because groundwater is not used at the Site and institutional controls are in place that restrict use of Site groundwater. For OU2 (Table I-7) the cleanup goals remain valid for aluminum and manganese because the most recent data show that the concentrations for these two metals are below the tap water RSLs.

Table I-6: Health Evaluation of OU1 Groundwater COC Cleanup Levels

COC	1994 ROD Cleanup Level (µg/L)	Tap Water RSL[a] (µg/L)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-BHC	0.03	0.0072	97	4 x 10^{-6}	0.0003
Beta-BHC	0.1	0.025	NA	4 x 10^{-6}	--
DDD	0.77	0.032	NA	2 x 10^{-5}	--
DDT	0.54	0.23	10	2 x 10^{-6}	0.05
Lindane	0.2	0.042	3.6	5 x 10^{-6}	0.06
Methyl Parathion	3.9	NA	4.5	--	0.9
Organic Compounds					

Table I-5: Health Evaluation of OU2 Sediment Cleanup Levels

COC	1999 ROD Cleanup Goals (mg/kg)	Residential RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
Gamma-chlordane	0.1	1.7	35	6 x 10^{-8}	0.003
DDD	5.0	2.3	NA	2 x 10^{-6}	--
DDE	5.0	2.0	NA	3 x 10^{-6}	--
DDT	5.0	1.9	37	3 x 10^{-6}	0.1
Toxaphene	3.0	0.49	NA	1 x 10^{-6}	--
Inorganic Compounds					
Copper	20	NA	3,100	--	0.006
Lead	330	400[d]		<400	
Zinc	100	NA	23,000	--	0.004

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 6/17/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. RSL based on the EPA's blood lead model.

NA = toxicity values not established by the EPA.

-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.

The screening-level risk evaluation of groundwater cleanup goals indicates that xylene at OU1 and aluminum and manganese at OU2 are equivalent to a HQ greater than 1.0 (Table I-6 and Table I-7, respectively). According to the data review (Appendix H), the concentrations shown in the monitoring data also exceed the more stringent RSLs. The RSL comparison reveals that the xylene MCL may not be protective of human health. Based on the current toxicity assessment and standard drinking water and showering exposure assumptions, the EPA Region 4 recommends a concentration of 3,500 µg/L as a health-protective remedial level for total xylenes in groundwater. Although the Region 4 recommended value of 3,500 µg/L is more stringent than the current federal MCL, the remedy remains protective for OU1 because groundwater is not used at the Site and institutional controls are in place that restrict use of Site groundwater. For OU2 (Table I-7) the cleanup goals remain valid for aluminum and manganese because the most recent data show that the concentrations for these two metals are below the tap water RSLs.

Table I-6: Health Evaluation of OU1 Groundwater COC Cleanup Levels

COC	1994 ROD Cleanup Level (µg/L)	Tap Water RSL[a] (µg/L)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-BHC	0.03	0.0072	97	4 x 10^{-6}	0.0003
Beta-BHC	0.1	0.025	NA	4 x 10^{-6}	--
DDD	0.77	0.032	NA	2 x 10^{-5}	--
DDT	0.54	0.23	10	2 x 10^{-6}	0.05
Lindane	0.2	0.042	3.6	5 x 10^{-6}	0.06
Methyl Parathion	3.9	NA	4.5	--	0.9
Organic Compounds					

COC	1994 ROD Cleanup Level (µg/L)	Tap Water RSL[a] (µg/L)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Ethylbenzene	700	1.5	810	5 x 10^{-4} [d]	0.9
Xylene	10,000	NA	190	--	**53**

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 7/26/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. The EPA has not yet classified this compound as a carcinogen; the value was based on toxicity values from the California Environmental Protection Agency. The cleanup goal is equivalent to the MCL and the MCL remains current.

NA = toxicity values not established by the EPA.

-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.

Bold = noncancer HQ exceeds 1.0 or a cancer risk of 1 x 10^{-4}.

Table I-7: Health Evaluation of OU2 Groundwater COC Cleanup Levels

COC	1994 ROD Cleanup Level (µg/L)	Tap Water RSL[a] (µg /L)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Pesticides/Herbicides					
Alpha-BHC	0.03	0.0072	97	4 x 10^{-6}	0.0003
Gamma-BHC	0.2	0.042	3.6	5 x 10^{-6}	0.06
Dinoseb	7	NA	15	--	0.5
Endrin	2	NA	2.3	--	0.9
Inorganic Compounds					
Aluminum	28,702	NA	20,000	--	**1.4**
Beryllium	4	NA	25	--	0.2
Cadmium	5	NA	9.2	--	0.5
Iron	8,611	NA	14,000	--	0.6
Lead	15	15		NA[d]	
Manganese	660	NA	430	--	**1.5**
Nickel (as soluble salts)	100	NA	390[e]	--	0.3
Nitrate/Nitrite	1,000	NA	2,000	--	0.5

Notes:

a. Current EPA RSLs, dated May 2016, are available at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 2/26/2016).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:
Cancer risk = (Cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:
HQ = Cleanup level ÷ noncancer-based RSL

d. RSL based on the EPA's blood lead model.
NA = toxicity values not established by the EPA.

e. Assume nickel is in the form of soluble salts.
-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established.
Bold = noncancer HQ exceeds 1.0.

Changes in Risk Assessment Methods

The PRP contractor evaluated the vapor intrusion pathway in 2008 at OU1 for two COCs, ethylbenzene and xylene. The vapor intrusion risk evaluation demonstrated that groundwater concentrations at the Site did not pose a vapor intrusion health concern for on-site workers. However, the concentrations could pose a noncancer health hazard to future residents. A screening-level vapor intrusion evaluation was conducted using the EPA's Vapor Intrusion Screening Level (VISL) calculator to determine if the 2008 vapor intrusion conclusions have changed. The most current groundwater data indicate that the highest VOC concentrations detected in July 2016 were identified in shallow well MW-10S. As shown in Table I-8, the 2016 concentrations of ethylbenzene and xylene in MW-10S results in a noncancer HQ at or below 1.0 for both default industrial and residential exposures. The concentration of ethylbenzene is equivalent to the upper bound of the EPA's risk management range of 1×10^{-4} for industrial land use but exceeds this risk level for a future residential land use. The EPA has not classified ethylbenzene as a carcinogen and considers the toxicological data limited and for conservative purposes EPA uses a cancer toxicity value from the California EPA to screen the vapor intrusion pathway. Based on the analytical results from all wells sampled (Table H-2) concentrations of ethylbenzene and xylene above the ROD cleanup goals appears more localized in MW-10S and not widespread as most wells were below detection or well below the cleanup goals. These results suggest the vapor intrusion pathway may be limited to the MW-10S location and that the vapor intrusion pathway be evaluated at the time redevelopment is considered for this area.

Table I-8: VISL Results Using Data from MW-10S

COC	Groundwater Concentration July 2017 (µg/L)[a]	2016 VISL Calculator [b] (average groundwater temperature 25°C)			
		Industrial Exposure		Residential Exposure	
		Cancer Risk	Noncancer HQ	Cancer Risk	Noncancer HQ
Ethylbenzene	1,700 (MW-10S)	1×10^{-4}	0.1	**5×10^{-4}**	0.5
Xylenes	480 (MW-10S)	--	0.3	--	1

Notes:
a. Annual System Performance Monitoring Report, prepared by ARCADIS. 2017.
b. VISL calculator version 3.5.1 accessed 9/2/2016 at http://www.epa.gov/vaporintrusion.
Bold = exceedance of a 1×10^{-4} cancer risk or a noncancer HQ of 1.
-- = The EPA has not classified these COCs as carcinogenic.

Changes in Exposure Pathways

There have been no changes in site conditions that would suggest the presence of new exposure pathways.

Expected Progress Toward Meeting RAOs

The remedies are working as designed, however, enhancements are being evaluated to reduce the remediation timeframe.

APPENDIX J – INTERVIEW FORMS

Marzone Inc./Chevron Chemical Co. Superfund Site **Five-Year Review Interview Form**

Site Name: Marzone Inc./Chevron Chemical Co. **EPA ID No.:** GAD991275686

Interviewer Name: N/A **Affiliation:**
Subject Name: Allen Just **Affiliation:** ARCADIS
Subject Contact Information:
Time: **Date:** 11/10/2016
Interview Location:
Interview Format (circle one): In Person Phone Mail Other: email
Interview Category: O&M Contractor

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   Overall, the project is going well. CCC began a pilot test in 2013 and conducted additional assessment activities in 2015 and 2016.

2. What is your assessment of the current performance of the remedy in place at the Site?

   The remedy is functioning as designed.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

   A statistical analysis was performed to evaluate the concentration trends for wells MW-5D, MW-10S, and MW-15S, and the system influent (SP-01). The results indicated 10 statistically significant downward trends and two statistically significant upward trends. The two statistically significant upward trends were for 4,4-DDD in MW-10S and the system influent (SP-01). The 4,4-DDD spike reported for MW-10S in June 2014 may be the result of the injection activities. In 2016, the 4,4-DDD concentration decreased to below the site-specific cleanup level of 0.77 µg/L. The detected 4,4-DDD concentrations (maximum 0.61 µg/L) reported for the system influent (SP-01) have all been below the site-specific cleanup level.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

   There is not a continuous on-site O&M presence. The routine O&M activities are conducted on a quarterly basis. The quarterly O&M tasks include: monitoring the water levels at the system influent and effluent, and within the reactors; estimating the system flow rate; manually flushing the funnel-and-gate system; and checking the solar-powered flushing system. The system influent and effluent and reactors are sampled semiannually. Selected groundwater wells are sampled annually.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

   No significant changes during the last five years.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

   No unexpected O&M difficulties were encountered during the last 5 years.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

   No optimization of the O&M activities occurred during the last 5 years. But in 2013, CCC began the process of evaluating alternatives to optimize the existing remedial system.

8. Can you please provide general order of magnitude O&M costs for the last five years.

   The average annual cost for routine O&M activities was $51,000. In addition to the routine O&M activities, CCC conducted the following tasks:

   - 2013: Installed monitoring well MW-15S; replaced existing flush-mounted well boxes with monument-style well protectors; conducted remedial pilot test (backfilled 13 boreholes with approximately 1,950 pounds of EHC™ [combination of zero-valent iron and carbon source]); and performed post-injection monitoring.
   - 2015: removed vegetation along the fence line; repaired two sections of the fence; and collected groundwater samples from additional on-site monitoring wells.
   - 2016: installed ten temporary monitoring points and collected groundwater samples.

Annual O&M Costs

Date Range	Total Cost *(rounded to the nearest $1,000)*
2012	$52,000
2013	$108,000
2014	$53,000
2015	$78,000
2016	$68,000

9. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

   CCC began a pilot test in May 2013. The objective of the pilot test was to evaluate the effectiveness of EHC to reduce the total BHC concentrations in the groundwater via reductive dechlorination. Approximately 1,950 pounds of EHC™ was injected into 13 boreholes upgradient of wells MW-10S and MW-10D. The post-injection monitoring results indicated decreases in total BHC concentrations reported for MW-10S from 12.4 µg/L in 2012 to 3.3 µg/L in 2014. The total BHC concentrations

rebounded in 2015 (10.4 µg/L) and then decreased again in 2016 (7.1 µg/L). In addition, the oxygen reduction potential values since the injection activities have generally decreased and indicated significant reducing conditions at well MW-10S in 2013 and 2016.

Based on the groundwater monitoring data, we recommend the following modifications to the annual groundwater monitoring program:

- Add monitoring well MW-10D, because elevated alpha- and beta-BHC were reported for this well during the additional groundwater monitoring activities conducted in 2015.
- Eliminate the analysis of the groundwater samples for organophosphate pesticides by EPA Method 8270, because methyl parathion (the only organophosphate pesticide considered to be a groundwater COC) was not detected during the annual monitoring events in 2015 and 2016.

In addition, we would recommend eliminating the quarterly salt flow tests to estimate the remedial system flowrate. The system relies on gravity so the flowrate is dependent on the water levels within the reactors. Discontinuing collection of the estimated flowrate data will not affect the system operation or performance.

Based on the results of the additional groundwater investigation conducted in 2016, elevated total BHC concentrations (maximum 72.4 µg/L) were detected in the groundwater samples collected from the temporary monitoring points installed upgradient of wells MW-10S and MW-10D. CCC has proposed to install additional temporary monitoring points at the adjacent property in 2017.

Marzone Inc./Chevron Chemical Co. Superfund Site **Five-Year Review Interview Form**

Site Name: Marzone Inc./Chevron Chemical Co. **EPA ID No.:** GAD991275686

Interviewer Name: First Name Last Name **Affiliation:** Skeo/ EPA / Other Name

Subject Name: Yi Lu **Affiliation:** GAEPD

Subject Contact Information:

Time: 04:00 p.m. **Date:** 11/16/2016

Interview Location:

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: State Agency

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   The project was well managed. Soil excavation was extensive and top soil has met the performance standards. Active groundwater remediation and routine groundwater monitoring are ongoing. The groundwater interception system (funnel-and-gate) at OU1 is working properly with scheduled maintenance. The groundwater monitoring systems at both OU1 and OU2 are generally in good condition.

2. What is your assessment of the current performance of the remedy in place at the Site?

   At OU1, natural attenuation is working on the southern part of the unit, while on the northern part the groundwater is intercepted and treated by the funnel-and-gate system. Another active soil and groundwater remediation north of the funnel-and-gate system is likely to occur, as subsoil and groundwater data are continuously collected.

   At OU2, zero valent iron injection, part of an in-situ chemical reduction pilot study, was completed in May 2014 in an area delineated around MW02SH and MW08SH. As a result, dinoseb and elevated nitrate/nitrite concentrations may become lower, and pH values may improve. Outside the study area, low nitrate/nitrite concentrations were generally above the groundwater performance standard, while other constituents of concern have generally met the standards.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   GAEPD has maintained a comprehensive complaint tracking system. A search in the system did not find any complaints related to the Site.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

   No.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

   No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

   The effectiveness of the in-situ chemical reduction and of nitrate/nitrite natural attenuation at OU2 should be studied to determine if institutional controls are necessary for OU2. An environmental deed affidavit was recorded for the Golden Seed/Taylor property (tax parcel number T061 021), a main portion of OU2, on June 15, 1995.

   An environmental covenant was placed on the former Slack property (tax parcel number T061 014) at OU1, on January 22, 2013.

7. Are you aware of any changes in projected land use(s) at the Site?

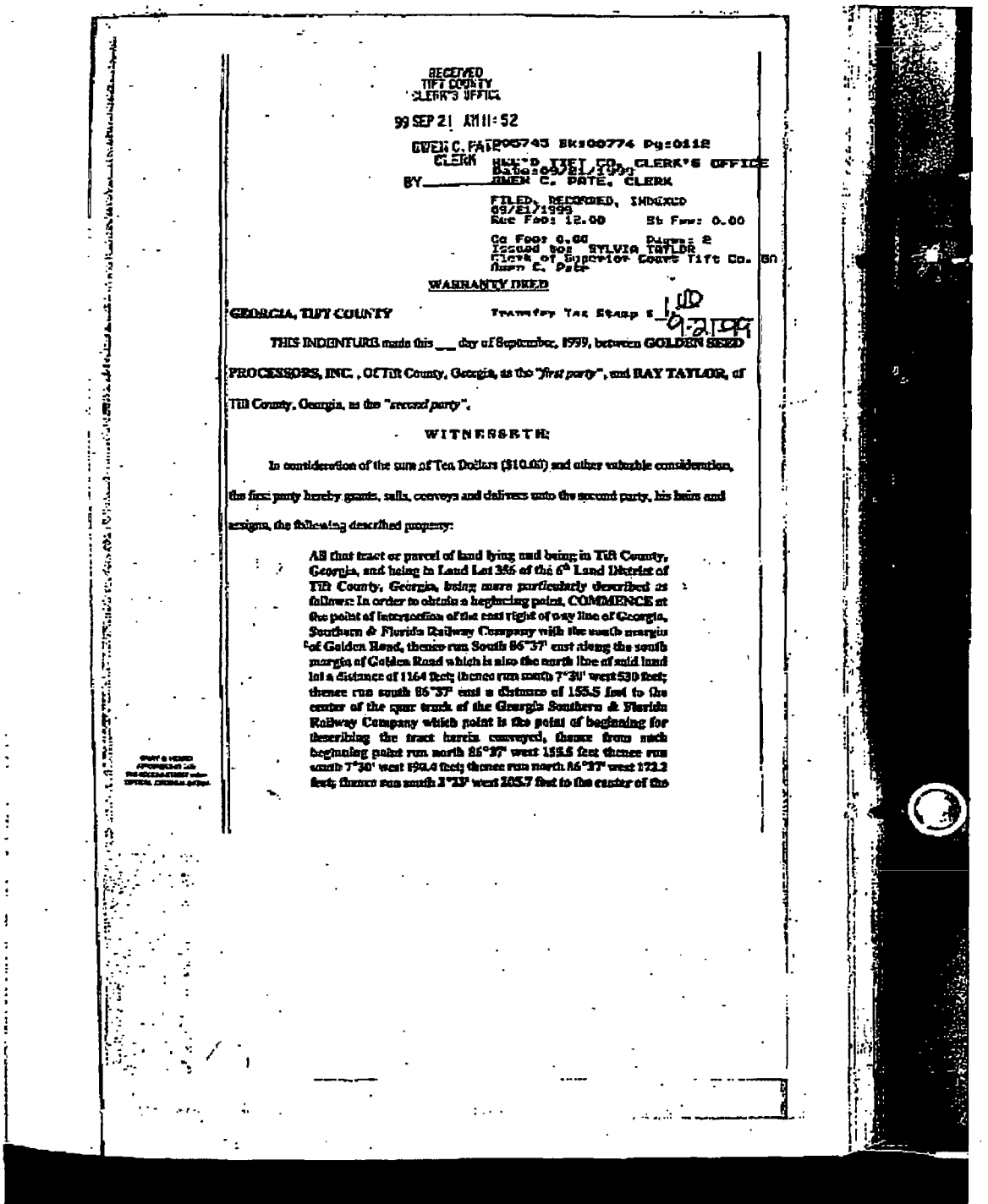
   No.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   In-situ chemical oxidation in the soil and saturated zone in a selected area north of the funnel-and-gate system at OU#1 may be one of the remedial choices to achieve cleanup goals earlier.

   Study the effectiveness of the remedies at OU#2 to guide future actions.

APPENDIX K – INSTITUTIONAL CONTROLS



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TIFT COUNTY
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GWEN C. PATE 005743 Bk:000774 Pg:0112
CLERK RECORD TIFT CO. CLERK'S OFFICE
Date:09/21/1999
BY GWEN C. PATE, CLERK

FILED, RECORDED, INDEXED
09/21/1999
Rec Fee: 12.00 St Fee: 0.00

Co Fee: 0.00 Pages: 2
Issued by: SYLVIA TAYLOR
Clerk of Superior Court Tift Co. GA
Gwen C. Pate

WARRANTY DEED

GEORGIA, TIFT COUNTY Transfer Tax Stamp $ 1.00 9-21-99

THIS INDENTURE made this ___ day of September, 1999, between GOLDEN SEED PROCESSORS, INC., OF Tift County, Georgia, as the "*first party*", and RAY TAYLOR, of Tift County, Georgia, as the "*second party*".

WITNESSETH:

In consideration of the sum of Ten Dollars ($10.00) and other valuable consideration, the first party hereby grants, sells, conveys and delivers unto the second party, his heirs and assigns, the following described property:

All that tract or parcel of land lying and being in Tift County, Georgia, and being in Land Lot 356 of the 6th Land District of Tift County, Georgia, *being more particularly described as follows:* In order to obtain a beginning point, COMMENCE at the point of intersection of the east right of way line of Georgia, Southern & Florida Railway Company with the south margin of Golden Road, thence run South 86°37' east along the south margin of Golden Road which is also the north line of said land lot a distance of 1164 feet; thence run south 7°30' west 530 feet; thence run south 86°37' east a distance of 155.5 feet to the center of the spur track of the Georgia Southern & Florida Railway Company which point is the point of beginning for describing the tract herein conveyed, thence from such beginning point run north 86°37' west 155.5 feet thence run south 7°30' west 190.4 feet; thence run north 86°37' west 172.2 feet; thence run south 3°23' west 265.7 feet to the center of the

spur tract of the Georgia, Southern & Florida Railway Company, thence run in a northeasterly and northern direction along the center of said spur track a distance of 546 feet to the point or place of beginning; the said tract containing 1.3 acres, more or less, as shown by a plat of said land prepared by Harold G. Harper which is recorded in Plat Book 3, page 279, records of Tift County, Georgia.

This is the same property described as "Tract I" in deed to Nova Fertilizer, Inc., dated December 7, 1982, and recorded in Deed Book 210 on page 145 in the office of the Clerk of the Superior Court of Tift County, Georgia.

TO HAVE AND TO HOLD such properties in fee simple with all rights and appurtenances thereunto belonging unto the second party, his heirs and assigns, and the first party will warrant and forever defend the title thereto against the lawful claims of all persons whomsoever by virtue of these presents.

IN WITNESS WHEREOF, the first party has hereunto signed its name and affixed its seal on the day and year first above written.

GOLDEN SEED PROCESSORS, INC.

By: _____
RAY TAYLOR, PRESIDENT

Attest: _____

[SEAL]

This Document Prepared by:
JOSEPH B. GRAY, JR.
Gray & Ward, LLC
P.O. Drawer 1933
Tifton, GA 31793
(912)382-4577

000743 Bk:00774 Pg:0113
RECD TIFT CO. CLERK'S OFFICE
Date:09/21/1999
GWEN C. PATE, CLERK

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TIFT COUNTY
CLERK'S OFFICE
00 JUL 26 AM 11:52
GWEN C. PATE
CLERK
BY

MAY - 8 AM
10858.1501

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REC'D TIFT CO. CLERK'S OFFICE
Date:07/26/2000
GWEN C. PATE, CLERK

FILED, RECORDED, INDEXED
07/26/2000
Rec Fee: 16.00 St Fee: 0.00
Co Fee: 0.00 Pages: 4
Issued to:
Clerk of Superior Court Tift Co. GA
Gwen C. Pate

After recording, return to:
Richard H. Willis, Esq.
Nelson Mullins Riley & Scarborough, L.L.P.
999 Peachtree Street, N.E., Suite 1400
Atlanta, Georgia 30309

STATE OF GEORGIA

COUNTY OF TIFT

DECLARATION OF RESTRICTIONS LIMITING GROUNDWATER USE AND OTHER ACTIVITIES RELATING TO GROUNDWATER ON REAL PROPERTY

THIS DECLARATION OF RESTRICTIONS LIMITING GROUNDWATER USE AND OTHER ACTIVITIES RELATING TO GROUNDWATER ON REAL PROPERTY is made this 1st of May, 2000, by Charles Ray Taylor, an individual resident of the State of Georgia having a mailing address of 386 Ray Taylor Road, Tifton, Georgia 31794 ("Declarant").

WITNESSETH:

WHEREAS, Declarant, is the owner in fee simple of certain real property located in Tift County, Georgia, said property being more particularly described on Exhibit "A" attached hereto (the "Property"); and

WHEREAS, the Property has been previously the site of a pesticide formulating facility, and was used for chemical storage;

WHEREAS, the United States Environmental Protection Agency ("USEPA") issued a Record of Decision for Operable Unit No. 1 ("ROD") on September 30, 1994, as modified, containing performance standards for the remediation of contaminants found in groundwater at the Property;

WHEREAS, the Property is subject to an ongoing environmental remediation being conducted pursuant to a Unilateral Administrative Order ("UAO") issued by the USEPA to

Chevron Chemical Company and Kova Fertilizer, Inc., dated July 11, 1995 (USEPA Docket No. 95-21-C), as modified September 9, 1997; and

WHEREAS, pursuant to the UAO issued by the USEPA and an agreement between Declarant and Chevron Chemical Company, Declarant wishes to restrict the use of the Property such that only water from approved sources may be used thereon and groundwater beneath the Property may not be accessed or used; and

WHEREAS, Declarant wishes to restrict access to the groundwater on the Property through wells or any other means, except as approved and authorized by USEPA.

NOW, THEREFORE, DECLARANT HEREBY declares and consents that the Property is and shall be held, transferred, altered, sold, conveyed, leased, rented, mortgaged, occupied, used, and otherwise disposed of subject to the restrictions as hereinafter set forth.

1. Use Restrictions. To ensure the protectiveness of the remedy selected by the USEPA in the ROD, the groundwater beneath the Property may not be used for any purpose except as expressly directed or authorized by USEPA. No wells may be drilled on the Property except as directed or authorized by the USEPA. Only water supplied by the City of Tifton or Tift County (or some other governmental or quasi-governmental agency or duly franchised utility with lawful authority to supply water for potable and other uses) may be used in connection with the ownership, use and/or occupancy of the Property.

2. Term of Restrictive Covenant. This Declaration shall run with the land and in express favor of the State of Georgia Department of Natural Resources, Environmental Protection Division ("GEPD"), pursuant to O.C.G.A. §44-5-60(c) and as such, shall be perpetual in nature and shall have no time limitation. To the extent that any court of competent jurisdiction determines after a final and binding judgment that this Declaration may not run in perpetuity, it shall be for a term of twenty (20) years, and renewable thereafter by the express permission of the Owner, his successors, heirs and assigns, granted herewith. Notwithstanding the foregoing, this Declaration shall terminate and be of no further force and effect upon recordation of a finding, statement or decision issued by the USEPA or its designee or successor stating that the restrictions set forth herein are no longer necessary to protect the human health and welfare and the environment.

3. Enforcement. This Restrictive Covenant shall be enforceable by Owner and his successors, heirs and assigns and by the USEPA and/or GEPD and Chevron and their respective successors and assigns. For purposes of this Paragraph, "Chevron" shall mean Chevron Chemical Company, LLC ("CCC"), the parent and each subsidiary and affiliate of CCC, any entity with which or into which CCC merges or is consolidated and any entity that acquires all or a substantial part of the assets or equity interests of CCC.

IN WITNESS WHEREOF, Declarant hereto sets his hand and seal the day and year first above written.

Signed, sealed and delivered in the presence of:

Sara Moore, N.P.

Notary Public

Witness

DECLARANT:

Charles Ray Taylor (L.S.)

Commission Expiration Date: [illegible] COUNTY, OHIO
[illegible] EXPIRES JAN 20, 2001

[Notarial Seal]

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REC'D TIFT CO. CLERK'S OFFICE
Date:07/26/2000
GWEN C. PATE, CLERK

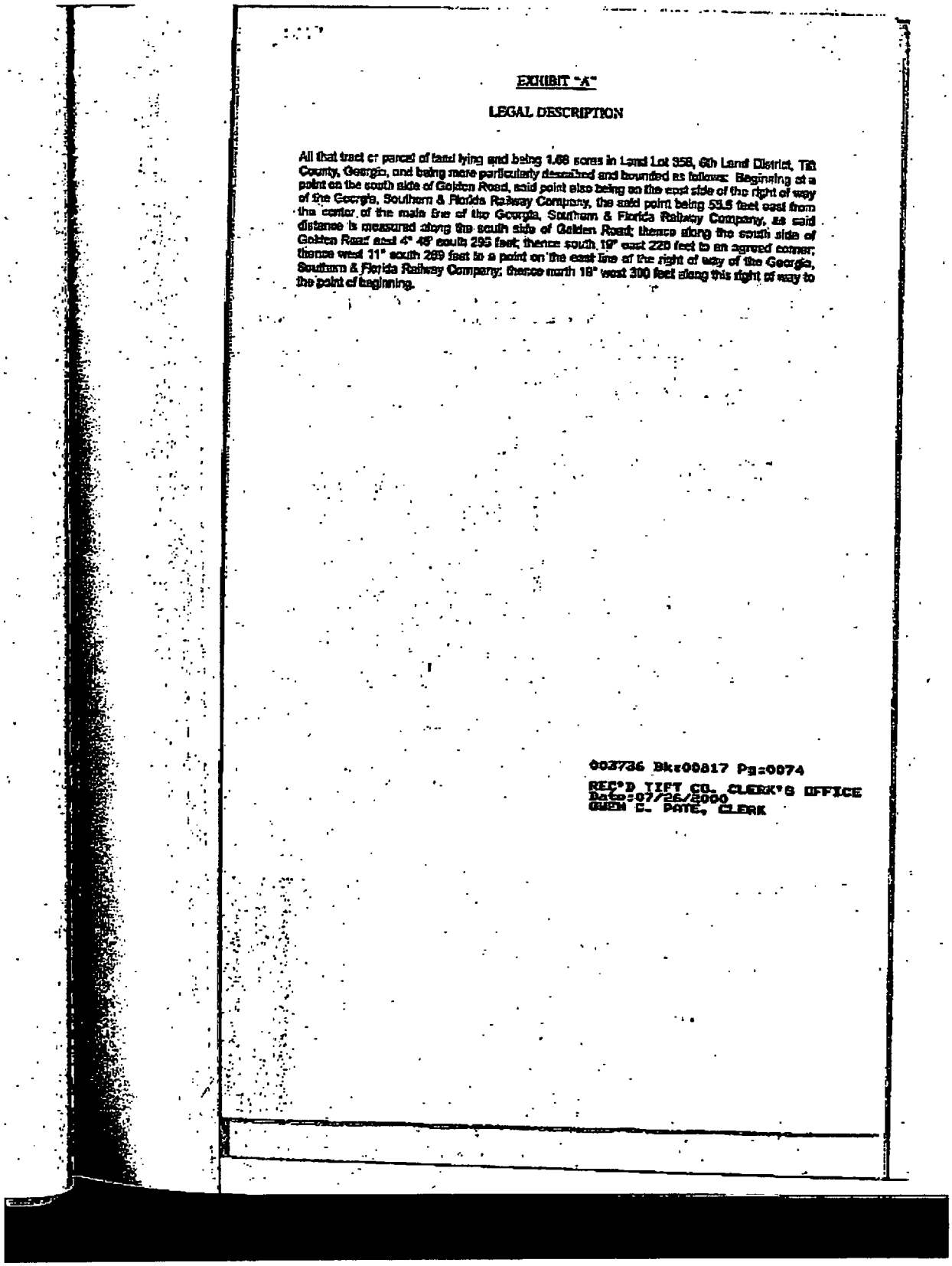


EXHIBIT "A"

LEGAL DESCRIPTION

All that tract or parcel of land lying and being 1.68 acres in Land Lot 358, 6th Land District, Tift County, Georgia, and being more particularly described and bounded as follows: Beginning at a point on the south side of Golden Road, said point also being on the east side of the right of way of the Georgia, Southern & Florida Railway Company, the said point being 53.5 feet east from the center of the main line of the Georgia, Southern & Florida Railway Company, as said distance is measured along the south side of Golden Road; thence along the south side of Golden Road east 4° 48' south 295 feet; thence south 19° east 220 feet to an agreed corner; thence west 11° south 289 feet to a point on the east line of the right of way of the Georgia, Southern & Florida Railway Company; thence north 19° west 300 feet along this right of way to the point of beginning.

003736 Bk:00817 Pg:0074
REC'D TIFT CO. CLERK'S OFFICE
Date:07/26/2000
GWEN C. PATE, CLERK

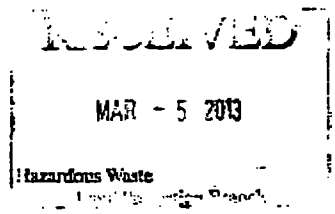
Nelson Mullins

Nelson Mullins Riley & Scarborough L.L.P
Attorneys and Counselors at Law
Atlantic Station / 201 17th Street, NW / Suite 1700 / Atlanta, GA 30363
Tel: 404.322.6000 Fax: 404.322.6050
www.nelsonmullins.com

James E. Holmes, Jr.
(Admitted in GA & FL)
Tel: 404.322.6131
jim.holmes@nelsonmullins.com

March 3, 2013

VIA FEDERAL EXPRESS



Mr. Yi Lu
Georgia Department of Natural Resources
Environmental Protection Division
Environmental Protection Division
Floyd Towers East, Suite 1154
2 Martin Luther King Jr. Drive, SE
Atlanta, Georgia 30334-09000

Re: ***Recorded environmental covenant for property located at 900 East Golden Road, Tifton, Tift County, Georgia; Tax Parcel No. T061 014 (the "Property")***
Our file no. 00301.09105

Dear Yi:

Attached please find the originally executed covenant referenced above, which has been recorded in the land records of Whitfield County, Georgia. Also, please note that a copy of the recorded covenant has been sent to each of the notice parties in the manner required by the Georgia Uniform Environmental Covenants Act.

Thank you for your attention to this matter. Should you have any questions, please do not hesitate to call.

Respectfully,

James E. Holmes, Jr.

Enclosure
cc: Richard Hughes *(via e-mail w/ enclosure)*
John Macleod *(via e-mail w/ enclosure)*

State of Georgia, Tift County
Superior Court Clerk's Office
Filed and Recorded in this
office this 22nd
day of Jan, 2013
time: 2:58pm
Clerk of Superior Court

000402

VOL. 1669 PG. 282

After Recording Return to:

Georgia Environmental Protection Division
Hazardous Sites Response Program
2 Martin Luther King, Jr. Drive, SE
Suite 1462 East
Atlanta, Georgia 30334

Environmental Covenant

This instrument is an Environmental Covenant executed pursuant to the Georgia Uniform Environmental Covenants Act, O.C.G.A. § 44-16-1, *et seq.* This Environmental Covenant subjects the Property identified below to the activity and/or use limitations specified in this document. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded in accordance with O.C.G.A. § 44-16-8(a).

Grantor/Fee Owner of Property: Charline S. McElroy
900 East Golden Road
Tifton, GA 31793

Grantee/Entity with express power to enforce: State of Georgia, Department of Natural Resources
Environmental Protection Division
2 Martin Luther King Jr. Drive, SE, Suite 1152
Atlanta, GA 30334

and

Additional Agency Overseer: U.S. Environmental Protection Agency
Region 4
61 Forsyth Street, N.W., Suite 925
Atlanta, GA 30303

Grantee/Holder/Access Rights: Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, CA 94583

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2013 JAN 22 PM 2:58

Property:

The area subject to this Environmental Covenant includes all that tract or parcel of land lying and being in the County of Tift, State of Georgia, in Land Lot 356 in the 6th Land District, and being more particularly described as follows: BEGINNING at a point where the South right of way of Golden Road intersects with the East right of way line of the GS&F Railroad and running thence South 86 degrees 30 minutes East along the Southern edge of the right of way of Golden Road a distance of 295.61 feet to a stake, which is the beginning point; running thence South 86 degrees 30 minutes East a distance of 194.72 feet to a stake, thence running South 1 degree 14 minutes West a distance of 329.24 feet to a stake; thence running South 8 degrees 7 minutes East 382.36 feet to a stake, thence running North 86 degrees 30 minutes West 150.25 feet to a stake; thence running South 20 degrees 14 minutes East 75 feet to a stake; thence running North 86 degrees 30 minutes West a distance of 120.79 feet to a stake; thence running North 20 degrees 14 minutes West along the Eastern right of way line of GS&F Railroad a distance of 559.88 feet to a stake; thence running North 78 degrees 7 minutes 14 seconds East a distance of 269 feet to a stake; thence running North 18 degrees 58 minutes 39 seconds West a distance of 203.78 feet to the

point and place of beginning, said tract containing 4.59 acres, more or less, and being that tract of land shown as Tract I of a Survey for G.L. Slack and E.J. Riddle prepared by Gibbs & Harper Surveying Co. dated May 27, 1985, and recorded at Plat Book 16, Page 142, in the Office of the Clerk of Superior Court of Tift County, Georgia (see **Attachment A**). All references are to Tift County records.

Tax Parcel Number(s):

1061 014 of Tift County, Georgia

Name and Location of Administrative Records:

The remedial action at the Property that is the subject of this Environmental Covenant (hereinafter "**Remedial Action**") is described in the following documents:

- Record of Decision, issued by the U.S. Environmental Protection Agency (hereinafter "**EPA**") on September 30, 1994.
- Record of Decision Amendment, issued by the EPA on June 18, 1997.
- Record of Decision Amendment, issued by the EPA on November 10, 1998.
- Unilateral Administrative Order for Remedial Design and Remedial Action, issued by the EPA on July 11, 1995 (the "**Order**").
- Record of Decision Amendment, issued by the EPA on May 2, 2000.
- Consent Decree in the case of *United States v. Marzone*, Civil Action No. 7:02-CV-43, dated February 3, 2004, entered by the U.S. District Court for the Middle District of Georgia on Feb. 7, 2005.

These documents are available at the following locations:

Superfund Records Center
U.S. EPA, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Description of Contamination and Corrective Action:

This property has been listed on the state's hazardous site inventory and has been designated as needing corrective action due to the presence of hazardous wastes, hazardous constituents, or hazardous substances regulated under state law. Contact the property owner or the Georgia Environmental Protection Division for further information concerning this property. This notice is provided in compliance with the Georgia Hazardous Site Response Act.

This Declaration of Environmental Covenant is made pursuant to the Georgia Uniform Environmental Covenants Act, O.C.G.A. § 44-16-1 *et seq.*, the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §9601 *et seq.*, as amended ("**CERCLA**"), and the ROD by Tift County, its successors and assigns, and the State of Georgia, Department of Natural Resources, Georgia Environmental Protection Division (hereinafter "**EPD**"), its successors and assigns. This Environmental Covenant is required because a release of endrin, heptachlor, DDT, chlordane, toxaphene, atrazine, methyl and ethyl parathion, lindane, DDD, and malathion occurred on the Property. Endrin, heptachlor, DDT, chlordane, toxaphene, atrazine, methyl and ethyl parathion, lindane, DDD, and malathion are "regulated substances" as defined under the Georgia Hazardous Site Response Act, O.C.G.A. § 12-8-90 *et seq.*, and the rules promulgated thereunder (hereinafter "**HSRA**" and "**Rules**", respectively) and

"hazardous substances" as defined in CERCLA. The Remedial Action consists of deed restrictions; the design and construction of an in-situ funnel-and-gate system (consisting of an impermeable barrier wall which directs the contaminated groundwater through a granular activated carbon treatment medium); installation of ground-water monitoring wells; the start-up, operation, and maintenance of this system; reduction of contamination in groundwater south of the treatment system (approximately 7% of total contamination) by natural attenuation; and the implementation of the Operation and Maintenance Plan approved by EPA under CERCLA for the site on this Property.

Grantor hereby binds itself, its successors and assigns, to the activity and use restriction(s) for the Property identified herein and grants such other rights under this Environmental Covenant in favor of the Grantee/Holder/Access Rights, and EPD. EPD and EPA shall have full right of enforcement of the rights conveyed under this Environmental Covenant pursuant to HSRA, O.C.G.A. § 12-8-90 *et seq.*, and the Rules. Failure to enforce compliance with this Environmental Covenant in a timely manner or to enforce in a timely manner the use or activity limitations contained herein by any person shall not bar subsequent enforcement by such person and shall not be deemed a waiver of the person's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict EPD or EPA from exercising any other authority under applicable law.

Grantor makes the following declaration as to limitations, restrictions, and uses to which the Property is subject to and specifies that such declarations are perpetual, unless modified or terminated pursuant to the terms of this Environmental Covenant pursuant to O.C.G.A. § 44-16-9 or § 44-16-10; shall be covenants running with the land, pursuant to O.C.G.A. § 44-16-5(a); and shall be binding on all parties and all persons claiming under them, including all current and future owners (hereafter collectively "**Owner**") of any portion of or interest in the Property.

This Environmental Covenant shall inure to the benefit of EPD, EPA, Chevron and their respective successors and assigns, and shall bind the Owner and her heirs, executors, administrators, personal representatives, successors and assigns (the "**Grantor Parties**"), and shall be enforceable by the Director of EPD and his agents or assigns, Grantor and its successors and assigns, EPA, Chevron and its successors and assigns, and other parties as provided for in O.C.G.A. § 44-16-11, in a court of competent jurisdiction.

Use Limitation(s) and Restrictions:

1. Registry. Pursuant to O.C.G.A. § 44-16-12, this Environmental Covenant and any amendment or termination thereof, may be contained in EPD's registry for environmental covenants.

2. Notice. The Owner of the Property must give thirty (30) days advance written notice to EPD, EPA and Chevron Environmental Management Company (hereinafter, "**Chevron**") of the Owner's intent to change the use of the Property, apply for building permit(s), or propose any site work that would affect the Property or the Remedial Action referenced herein.

3. Notice of Limitation in Future Conveyances. Each instrument hereafter conveying an interest in the Property shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of the Environmental Covenant.

4. Monitoring. Owner acknowledges that Chevron has implemented and is operating and maintaining a groundwater detection-monitoring program as detailed in the EPA-approved Operation and Maintenance Plan dated July 2000. Owner agrees not to interfere with this program as the same may be amended from time to time.

5. Periodic Reporting. Upon request the Owner agrees to submit to EPD and EPA documentation stating whether or not, to its knowledge, the activity and use limitations in this Environmental Covenant are being met.

6. Activity and Use Limitation(s). The following shall not take place on the Property without obtaining prior written approval from EPD and EPA:

   a. Drilling or otherwise constructing any water wells; and

   b Engaging in activities that could cause damage to the Remedial Action, including, but not limited to, drilling or construction activities which could compromise the integrity of the final cover, or any component of the containment or treatment system, or the function of any monitoring system.

7. Groundwater Limitation. The use or extraction of groundwater beneath the Property for drinking water or for any other non-remedial purposes is prohibited.

8. Permanent Markers. Permanent markers on each side of the Property shall be installed and maintained that delineate the restricted area as specified in Section 391-3-19-.07(10) of the Rules. The Owner agrees that such markers may be installed by EPD, EPA or Chevron. Disturbance or removal of such markers is prohibited.

9. Right of Access. In addition to any rights already possessed by EPD and EPA, the Owner shall allow authorized representatives of EPD and EPA the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples; to inspect the Remedial Action conducted at the Property; to determine compliance with this Environmental Covenant; and to inspect records that are related to the Remedial Action.

10. Recording of Environmental Covenant and Proof of Notification. Within thirty (30) days after the date the last party hereto has executed the Environmental Covenant, Chevron shall file this Environmental Covenant with the Recorders of Deeds for each County in which the Property is located, and send a file-stamped copy of this Environmental Covenant to EPD and EPA within sixty (60) days of recording. Within the same sixty (60) day time period, Chevron shall also send a file-stamped copy to each of the following: (1) each person holding a recorded interest in the Property subject to the Environmental Covenant; (2) each person in possession of the real property subject to the Environmental Covenant; (3) each municipality, county, consolidated government, or other unit of local government in which real property subject to the Environmental Covenant is located; and (4) each owner in fee simple whose property abuts the property subject to the Environmental Covenant.

11. Termination or Modification. The Environmental Covenant shall remain in full force and effect in accordance with O.C.G.A. § 44-5-60, unless and until the EPD Director determines that the Property is in compliance with the Type 1, 2, 3, or 4 Risk Reduction Standards, as defined in Section 391-3-19-.07 of the Rules and removes the Property from the Hazardous Site Inventory, whereupon the Environmental Covenant may be amended or revoked in accordance with Section 391-3-19-.08(7) of the Rules and O.C.G.A. § 44-16-1 *et seq.*

12. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

13. No Property Interest Created in EPA or EPD. This Environmental Covenant does not in any way create any interest by EPA or EPD in the Property that is subject to the Environmental Covenant. Furthermore, the act of approving this Environmental Covenant does not in any way create any interest by EPA or EPD in the Property in accordance with O.C.G.A. § 44-16-3(h).

14. Access Right in Favor of Chevron. The Owner hereby grants Chevron and its authorized representatives a non-exclusive, perpetual right of entry in, over and upon the Property with personnel, vehicles, equipment, materials and supplies: (a) for the purposes set forth in Paragraphs 4, 8 and 9 above; (b) to perform the Remedial Action (as the same may amended from time to time), and (c) to comply with the Order and any other orders, directives or decrees issued by EPD or EPA with respect to environmental conditions at the Property. Chevron shall have the right to enforce its right under of entry for the purposes set forth above.

Representations and Warranties.

Grantor hereby represents and warrants to the other signatories hereto:

a) That the Grantor has the power and authority to enter into this Environmental Covenant and to grant the rights and interests herein provided;
b) That the Grantor is the sole owner of the Property and holds fee simple title which is free, clear and unencumbered;
c) That the Grantor has identified all other parties that hold any interest (e.g., encumbrance) in the Property and notified such parties of the Grantor's intention to enter into this Environmental Covenant;
d) That this Environmental Covenant will not materially violate, contravene, or constitute a material default under any other agreement, document or instrument to which Grantor is a party, by which Grantor may be bound or affected;
e) That this Environmental Covenant will not materially violate or contravene any zoning law or other law regulating use of the Property; and
f) That this Environmental Covenant does not authorize a use of the Property that is otherwise prohibited by a recorded instrument that has priority over the Environmental Covenant.

Notices.

Any document or communication required or permitted to be sent pursuant to the terms of this Environmental Covenant shall be in writing and sent to the following persons:

If to Grantor:	Charline S. McElroy 900 East Golden Road Tifton, GA 31793
If to Grantee/Entity with express power to enforce:	Branch Chief Georgia Environmental Protection Division Hazardous Waste Management Branch Georgia Environmental Protection Division Suite 1154, East Tower 2 Martin Luther King Jr. Drive SE Atlanta, GA 30334
If to Additional Agency Overseer:	Franklin E. Hill Director, Superfund Division

The United States Environmental Protection Agency
Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

If to Grantee/Holder/Access Rights:

Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, CA 94583

A party may change its address for purposes of this Environmental Covenant by giving notice to the other parties in the manner set forth above. Notices shall be deemed given, received and effective when delivered to the current notice address of the recipient.

In Witness Whereof, Grantor has caused this Environmental Covenant to be executed pursuant to The Georgia Uniform Environmental Covenants Act, on the 2nd day of May 2012.

Sworn and subscribed before me this
2 day of May, 2012

Unofficial Witness

Notary Public
My commission expires: 11-5-2012

[Notary Seal]

RHONDA SAEED NOTARY PUBLIC EXP. Nov. 05, 2012 COFFEE COUNTY, GA

GRANTOR:

CHARLINE S. MCELROY

~~Sworn and subscribed before me this~~
~~___ day of ___, 201_~~

~~Unofficial Witness~~

~~Notary Public~~
~~My commission expires:~~

~~[Notary Seal]~~

~~**GRANTEE/HOLDER:**~~

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

By:

[Printed name of person acknowledging receipt]

Title:

~~Dated:~~

GRANTEE/HOLDER/ACCESS RIGHTS:

Sworn and subscribed before me this
___ day of _____ ~~2011~~.
2012

Unofficial Witness

Notary Public
My commission expires: _____

[Notary Seal]

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

By: _____

Print name: Katherine Hoover

Title: EMC General Manager

Dated: 5/31/12

see attached p. 7A

ADDITIONAL AGENCY OVERSEER:

This Environmental Covenant is hereby approved by the United States Environmental Protection Agency this 15th day of January ~~2011~~.
2013

By: _____
Franklin E. Hill
Director, Superfund Division
U.S. Environmental Protection Agency
Region 4

Dated: 1/15/13

State of California
County of Contra Costa

Subscribed and sworn to (or affirmed) before me on this 31 day of May 31, 2012, by Katherine L. Howes, proved to me on the basis of satisfactory evidence to be the person who appeared before me.

Signature Laquanda Bartholomew (Seal)

LAQUANDA BARTHOLOMEW
Commission # 1887042
Notary Public - California
Contra Costa County
My Comm. Expires May 15, 2014

7A

GRANTEE/ENTITY WITH EXPRESS POWER TO ENFORCE:

STATE OF GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Sworn and subscribed before me this
11th day of December, 2012.

Deborah W. Moore
Unofficial Witness

Yolanda P. Fanning
Notary Public
My Commission Expires: Sept. 24, 2013

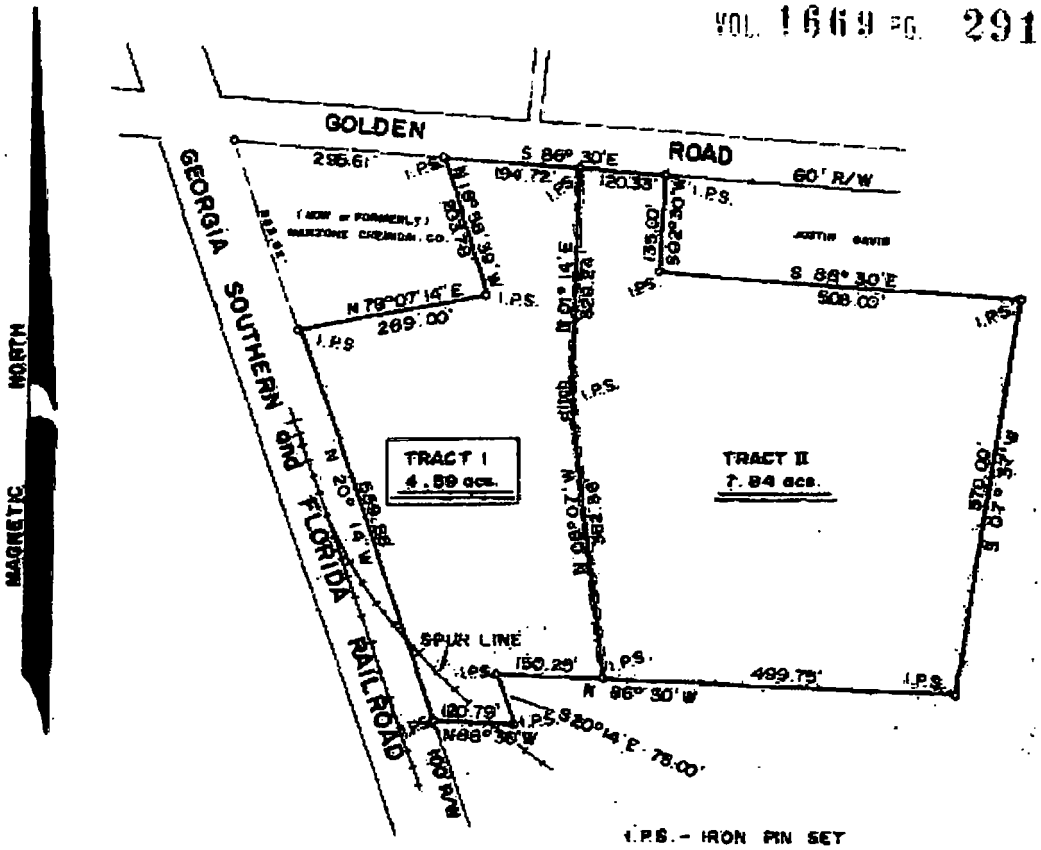
[Notary Seal]

By: Judson H. Turner

Judson H. Turner
[Printed name of person acknowledging receipt]

Title: Director

Dated: 12-11-2012



I.P.S. - IRON PIN SET

SURVEY FOR:
G. L. SLACK TRACT I AND
E. J. RIDDLE TRACT II
LOCATED IN LAND LOT 356
6th LAND DISTRICT
TIFT COUNTY, GEORGIA
scale: 1" = 200', date: 5/27/1985

GEORGIA REGISTERED SURVEYOR HAROLD E. HARPER

GIBBS and HARPER SURVEYING CO.
P.O. BOX 1781
TIFTON, GEORGIA 31793

I CERTIFY THAT THIS PLAT IS A CORRECT REPRESENTATION OF THE LAND PLATTED AND HAS BEEN PREPARED IN CONFORMITY WITH MINIMUM STANDARDS AND REQUIREMENTS

Attachment A